Sipre Report 12
Volume V
JANUARY, 1954

Bibliography on Snow, Ice and Permafrost

with Abstracts

SNOW, ICE AND PERMAFROST
RESEARCH ESTABLISHMENT
Corps of Engineers, U. S. Army

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INTRODUCTION

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The library from which the material was obtained for abstracting is indicated. The symbols used for the various libraries are identified below.

The bibliography presented in this volume includes SIP U5501 through SIP U7000 and is a continuation of Annotated Bibliography on Snow, Ice and Permafrost, Volumes I, II, III, and IV. Author and subject indexes are included as well as a title index covering abstracts for which the authors were unidentified and certain mnemonic titles.

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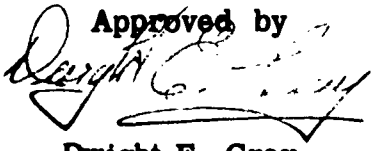

Dwight E. Gray

Chief, Technical Information Division

SIP U5501

[Mytarev, N. M.]
CLIMATE. (Klimat; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 4, Pt. 1:15-21 incl. tables, maps, 1935.
DLC, GB746.S7, v. 4

The climate of the central Volga area is characterized by temperatures below 0°C and a persistent snow cover during the winter. Winter lasts 175 days in the north near 60°N. lat. to 145 days in the south at about 52°N. lat. Snow constitutes 28% of the annual precipitation in the southwest and 37% in the northeast. The average duration of the snow cover is 130-168 days and the depth of the snow averages 40-70 cm. The snow-melting period usually lasts 30-40 days.

SIP U5502

[Spengler, O. A.]
OPENING AND FREEZING OF RIVERS. (Vskrytie i zamerzanie rek; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 4, Pt. 2: 523-533 incl. tables, 1935.
DLC, GB746.S75, v. 4

Ice conditions on rivers in the central Volga area are described on the basis of observations ranging from 10-50 yr. The data indicate that navigation on rivers opens between April 10-20. The earliest date of break-up was March 20, and the latest dates were May 5-7. Autumn freeze-up usually occurs between Nov. 1-20 with extremes varying between Oct. 15-Dec. 20. The mean duration of the autumn ice drift was 12-20 days for the Volga, 9-28 days for the Kama, and 3-16 days for the Vîatka.

SIP U5503

[Vansovich, A. L.]
SOIL FREEZING IN THE AREA OF CENTRAL VOLGA. (Promerzanie pochvy na territorii Srednego Povolzh'îa; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 4, Pt. 2:547-551 incl. tables, 1935.
DLC, GB746.S75, v. 4

Soil temperature data for the period 1897-1930 are presented. The soil usually begins to freeze in Sept., reaches maximum frost penetration in March, and is completely thawed in May. Maximum frost penetration (160 cm.) occurred near Kazan' and Annenkovo in the central part of the region. Other areas had maximum frost penetrations of 109-117 cm.

SIP U5504

[Nikolaev, N. G.]
GENERAL CHARACTERISTICS OF THE ICE REGIME OF RIVERS. (Obshchaîa kharakteristika ledovogo rezhima rek; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 4, Pt. 2:533-547 incl. table, diagrs. map, 1935.
DLC, GB746.S75, v. 4

Ice thickness measurements recorded in the central Volga area during 1926-1930 are tabulated and mapped. The maximum thickness of the ice cover in most parts of the territory was 50-75 cm. A thickness of 75-100 cm. and over was recorded at the Volga near Cheboksary and at the Vîatka River at midstream. A thicker cover developed on deep rivers with slow current. Anchor and frazil ice formation is common and induces an increase in the ice cover thickness.

SIP U5505

[Mytarev, N. M.]
SNOW COVER. (Snegovoĭ pokrov; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 4, Pt. 2:485-488, 500-505 incl. tables, diagrs. 1935.
DLC, GB746.S75, v. 4

The date of snow cover formation over the central Volga area is in good agreement with the date when the mean daily air temperature is 0°C. Occasional thaws in the early winter set the date of the onset of a stable snow cover at mid-Nov. The water equivalent of snow (density 0.25-0.28) reached a mean maximum of 185 mm. in the basin of the Vîatka River and a minimum of 65 mm. in the basin of the Sura, a tributary of the Volga.

SIP U5506

Birulîa, A. K.
PECULIARITIES OF SNOWDRIFT CONTROL ON SOUTHERN ROADS. (Osobennosti bor'by so snezhnymi zanosami na dorogakh îûga; Text in Russian). Stroitel'stvo Dorog, 5, No. 2-3:14-15, 1942.
DLC, TE4.S73, v. 5

The southern region of European USSR is characterized by frequent heavy snowstorms, massive snowdrifts, scant snow cover, and frequent thaws. Snowstorms lasting 5 days occur as often as 7 times during Dec.-Feb. Frequent and rapid melting of the snow cover greatly reduces the trafficability of dirt roads. Prevention of snowdrifts is more important than removal with plows. Snow fences are not recommended because strong winds flatten them and because wood is a scarce commodity in the southern steppe area. Stalks of corn and sunflowers are effective in drift prevention. Hedges of corn and sunflowers planted 20-30 m. wide along roads provide satisfactory protection.

SIP U5507

Pikush, M. V.
SOIL FREEZING STUDY. (Do pytannia pro vyvchennia promerzannia gruntiv; Text in Ukrainian). Visti Instytutu Gidrologii i Gidrotekhniky, 7:112-115 incl. graph, diagr. 1951. 1 ref.
DLC, TC1.A37, v. 7

Experimental investigations of soil freezing by measurements of electric conductivity variations were made during the winter 1948-49. Copper-plate electrodes, 1 x 10 cm., were inserted into the soil to a depth of 1 m. The electrodes were spaced 5 cm. apart. The conductivity of thawing soil was 100-120 ma. and that of frozen soil 30-50 ma. The daily temperatures did not drop lower than -10°C, and the maximum of frost penetration was 50-55 cm. Observations showed that the thawing processes in the soil began after snow melting and proceeded from above and from below the frozen layers. The intensity of soil thawing from above exceeded that from below.

SIP U5508

Green, Jack C. and Joseph P. McCartan
FIELD TEST OF SURVIVAL EQUIPMENT. SECTION A: AN EVALUATION OF THE CASUALTY CAMP, ARCTIC AERIAL DELIVERY (EXPERIMENTAL). First Arctic Aeromedical Lab. Ladd Air Force Base, Alaska, 3p. May 18, 1948. (Proj. III)
AMAU, M-32680-1-NC, Sect. A

The casualty camp, consisting of 1 tent, 1 stove, 1 axe, 1 mattock and pick combination, 3 sleeping bags and 1 stretcher, packed in an aerial delivery container and equipped with a parachute, was dropped to a ground party of 3 to determine suitability as an emergency shelter for military personnel in surviving conditions in the arctic winter. Temperatures during the test ranged from -20° to -38°F and light snow was falling. The camp can be rapidly dropped to survivors and easily assembled and is satisfactory for providing shelter and warmth.

SIP U5509

[Hrudička, B.]
METEOROLOGY IN THE SERVICE OF ELECTROTECHNICS. (Meteorologiia na sluzhbe elektrotekhniki; Text in Russian). Klimat i Pogoda, 12, No. 6:21-26, 1936.
DLC, QC851.L452, v. 12

Snow, glaze, rime, and hoarfrost formations on power lines are discussed. Snow deposits on lines during thaw weather attain depths of 10-20 cm. and increase the weight by 1-2 kg./m. Glaze formations produce loads up to 13 kg./m. Rime formations around wires attain diam. of 40 cm. causing considerable damages. A maximum rime deposit of 50 kg./m. was observed in Spain. Investigations indicate that the rime load increases with elevation above sea level. Rime intensity is affected by temperature inversion and foehns.

SIP U5510

Makarov, D. A.
INFLUENCE OF LOW TEMPERATURES ON THE HYDRATION OF SOILS. (Vliianie nizkikh temperatur na gidratatsiiu pochv; Text in Russian). Kolloidnyi Zhurnal, 13:298-300 incl. tables, 1951. 3 refs.
DLC, QD549.K925, v. 13

An increase of electrolyte concentration in thawed soils, determined by conductivity measurements, indicates an increase of dissociation of soil colloids in the range of 0° to -50°C. The increase was more noticeable in chernozem soils than in podzol and forest-steppe soils. A part of the adsorbed electrolytes changes into a liquid upon thawing and coagulation of the frozen sols occurs more rapidly than the coagulation of unfrozen sols. This occurrence is explained by the approach of the isoelectric point of soil colloids at which coagulation is facilitated. Data of bound water content were obtained before and after freezing at temperatures of 0° to -100°C. It is concluded that the freezing of soil is a basic factor in the increase of the hydrophilic nature of soils.

SIP U5511

Dautov, R. K.
INFLUENCE OF FOREST BELTS ON THE DEPTH OF SNOW COVER AND SOIL FREEZING. (Vliianie polezashchitnykh lesnykh polos na moshchnost' snegovogo pokrova i na glubinu promerzaniia pochv; Text in Russian). Doklady Akademii Nauk SSSR, 89:555-556 incl. table, 1953.
DLC, AS262.S3663, v. 89

Observations of the snow cover depth and density and of the soil temperature were made during the winter of 1949-50 in 2 forest belts. One belt, 16 yr. old, was on turf-podzolic soil; and the other, 12 yr. old, was on ordinary black soil. Measurements made within the belt region and at distances up to 250 m. showed a close relation between snow cover depth and soil freezing, and the great influence of forest belts on depth and density of the snow cover. The effect of the belts was noticed at a distance up to 100 m. A snow cover depth of 128-155 mm. in the belt area decreased to 46-45 cm. respectively at a distance of 250 m. Frost penetration usually 12-15 cm. under forest belts increased up to 116 cm. in turf-podzolic soil, and up to 89 cm. in black soil.

SIP U5512

Filin, M. K., N. N. Krasikova, and L. V. Glushkova
CHARACTERISTICS OF MAIN RIVERS OF THE REGION. (Kharakteristika glavnejshikh rek raiona; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 13, No. 3:5-54 incl. tables, maps, diagrs. 1933.
DLC, GB746.S75, v. 13

The river network of the Kazakhstan is described and data concerning the various hydrological elements

are presented. The largest rivers of the region were covered by ice an average of about 159-179 days. The mean period of freeze-up is in Nov. The spring opening is observed about April 15 in the Tobol, Ishim and Turgaĭ rivers. The break-up of the Irgiz river occurs about April 21.

SIP U5513

Voznesenskiĭ, A. V. and others
SNOW COVER. (Snegovoĭ pokrov; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 13, No. 4:8-9, 14-15, table, maps, 1933.
DLC, GB746.S75, v. 13

Data of 36 stations of the north Kasakhstan and neighboring regions covering the period of 1863-1930 are tabulated and mapped. The average duration of snow cover reached 150-180 days. An average snow cover depth of 5 cm. or more was observed at Kasalinsk for 80 days, at Zvenigorodskaĭa for 170 days and at Urkash for 153 days. The depth of snow cover before spring snow melting varied from less than 10 cm. south of 48°N. lat. and increased up to 40-60 cm. northward. The snow cover decreases during the spring thaw at the rate of 1.0-1.5 mm./day in the northern region, 0.5-1.0 mm./day in the main part of the territory and 0.2-0.3 mm./day in the Turgai and Karkalinsk regions.

SIP U5514

Carlson, Harry and L. A. Nees
DISCUSSION OF PILE FOUNDATIONS FOR LARGE TOWERS ON PERMAFROST. Proc. Am. Soc. Civil Engrs. 78, Separate No. D-103:3p. Dec. 1952.
DLC, Unbound periodical

Tests and studies on pile foundations design for sites in arctic and subarctic regions are discussed. Inquiries into the reported failure of tests involving a steel pipe are made. The effects of the diam. and depth of imbedment of the pile specimen in the frozen ground on the unit adhesive force are discussed. For a given temperature differential and length of pile a steel pipe would transmit to the ground about 75 times more heat than a wooden pile. An anchorage to resist uplift in the annual frost zone is discussed. Anchors with a diam. of at least 3 times the pile diam. are suggested for steamed-in piles. An increase of the pile length of drilled-in pipes to counteract probable forces developed by surface freezing is recommended. (See also SIP U1205)

SIP U5515

Monfore, G. E.
ICE PRESSURE AGAINST DAMS: EXPERIMENTAL INVESTIGATIONS BY THE BUREAU OF RECLAMATION. Proc. Am. Soc. Civil Engrs. 78, Separate No. 162:13p. incl. illus. table, graphs, diagrs. Dec. 1952. 11 refs.
DLC, Unbound periodical

The more important findings of the field and laboratory investigations on pressures produced by the thermal expansion of thick ice sheets are summarized. Electric resistance pressure gages and indentor pressure gages were used in the field to measure the pressures that develop in natural ice sheets. Ice cylinders were subjected to rising temperatures in laboratory investigations and the pressures necessary to prevent axial expansion were determined. The pressure that can develop in a restrained ice sample as the result of a temperature rise is limited by plastic flow. The maximum pressure depends on the initial temperature of the ice and on the rate at which the temperature is increased. The thrusts calculated from the laboratory data were in good agreement with those measured directly by the pressure gages. The highest seasonal thrusts measured for 3 winters ranged from 14-20 kips/linear ft. The maximum thrusts that might develop in other locations could be calculated from the laboratory data when information on ice temperature is available.

SIP U5516

Löfquist, Bertil
ICE PRESSURE AGAINST DAMS: STUDIES OF THE EFFECTS OF TEMPERATURE VARIATIONS. Proc. Am. Soc. Civil Engrs. 78, Separate No. 160:12p. incl. illus. graphs, diagrs. Dec. 1952. 7 refs.
DLC, Unbound periodical

An investigation made by the Swedish State Power Board is presented. The experimental arrangement for reproducing in a freezing chamber the conditions encountered in a sheet of ice in the field and for measuring the temperature and the stresses in the ice is described. The results of the experiment are unreliable for evaluating the absolute magnitude of the ice pressure, but indicate that relation between the ice pressure and the ice thickness. The ice pressure attains a maximum at a thickness of about 0.5 m. and increases with the rate of temperature rise. The magnitude of the ice pressure may be estimated within fairly narrow limits from the buckling load for sheets less than 0.5 m. thick. The ice pressure caused by variations of water level is discussed.

SIP U5517

Hogg, A. D.
ICE PRESSURE AGAINST DAMS: SOME INVESTIGATIONS IN CANADA. Proc. Am. Soc. Civil Engrs. 78, Separate No. 161: 4p. incl. illus. diagr. Dec. 1952.
DLC, Unbound periodical

Methods of investigation and the field installations used in recording ice pressures are described. Direct measurement of the force of the ice acting on the dam is measured by incorporating a special panel system at the time of the dam construction. The system consists of a vertical platform scale which transmits pressures exerted on it to load-measuring cells. The ultimate objective is the

determination of the probable maximum ice pressure for any condition, from the study of the measured ice pressures, the local weather records and other available influential factors.

SIP U5518

Bowden, F. P.
FRICTION ON SNOW AND ICE. Proc. Roy. Soc. (London), 217A:462-478 incl. tables, graphs, May 21, 1953. 14 refs.
DLC, Q41.L7, v. 217A

An experimental study of the friction of real ski and smaller models sliding on snow and ice at temperatures varying from -32° to 0°C was made. The surfaces investigated included ski lacquer; paraffin, Norwegian, and Swiss waxes; polytetrafluoroethylene (P.T.F.E.); perspex, terylene, and nylon plastics; and Al. The static friction rises as the temperature falls and is high on cold snow. Experiments on sand show a similarity between the friction on sand and on very cold snow. The friction is independent of the apparent area of the surfaces, is directly proportional to the applied load, and is the same on ice as on snow. The coefficient of kinetic friction is similar to the static value when the sliding speed is low. An increased speed produces a marked drop in friction which is due to a localized surface melting produced by frictional heating. The degree to which various surfaces are wet by water is discussed. Solids with a high contact angle give a lower friction. The coefficient of friction for most standard surfaces is high over the whole temperature range. P.T.F.E. gives a very low friction on snow and ice under all conditions. Typical results on ice at -4°C give 0.3 for plastics and 0.06 for P.T.F.E.

SIP U5519

Schramm, Charles K., Jr.
THE EFFECT OF WATER AND ICE ON MICROWAVE TRANSMISSION THROUGH RADOMES. Tech. Note WCLC 53-2. Wright Air Development Center, 8p. incl. illus. Feb. 1953.
ASTIA, AD9153

Photographic evidence is presented of the adverse effects of water films and ice accumulations on radome surfaces, and of atmospheric moisture lying between the radome and the target, on radar microwave transmission through radomes. Comparison of the scope picture made under dry conditions with that made when the radome had a thick surface water sheet gives evidence of a major reduction in microwave energy transmission through the radome. Radar degradation is evident even with a light water film on the radome surface, and the attenuation is larger for a water film than that caused by moderate icing conditions. Tests must be conducted to determine the attenuation and boresight shift caused by ice and water films on the surface of the radome, compared with the attenuation caused by interfering atmospheric moisture content and precipitation in order to arrive at the basic data necessary for future radome design.

SIP U5520

Le Page, L. S. and A. L. P. Milwright
RADAR AND ICE. J. Inst. Navigation, 6:113-127 incl. illus. tables, graphs, maps; Discussion, p.128-130, April 1953. 3 refs.
DLC, VK1.I5545, v. 6

Investigations on the detection of ice by radar from aboard an ice breaker are presented. The object of the investigation was to assess the extent to which radar can assist navigation in areas with large amounts of ice, to examine and classify the radar identification characteristics of various types of ice, to determine the characteristics of a radar satisfactory for ice navigation, to take measurements of the echo strengths of ice formations, and simultaneously take physical measurements to relate echo strength to range, target size and shape. The work involved measuring the over-all physical dimensions of ice formations photography, meteorological measurements, and observations of radar echoes on the screen and the measurement of their strength. Ice formations of all types ranging from large bergs at a distance of 15-20 mi. to small growlers at 2 mi. can be detected when the sea is calm. It is unsafe to rely upon radar under conditions of rough sea and bad visibility when sea clutter extends to beyond 1 mi. Fields of tight pack ice can be detected under all sea conditions out to ranges of about 3 mi. and leads through the ice over 1 cable wide are identifiable for a distance just under 3 mi. on modern British marine radars. Suggestions for improving the detection of ice in sea clutter are made.

SIP U5521

Rodhe, Bertil
ON THE RELATION BETWEEN AIR TEMPERATURE AND ICE FORMATION IN THE BALTIC. Geografiska Annaler, 34:175-202 incl. tables, graphs, 1952. 11 refs.
DLC, G25.G4, v. 34

A theory of a weighted mean air temperature which does not depend solely on the temperature below 0°C during a limited period and which is based upon a simplified physical law of heat flow between the sea surface and the air is presented. The sea surface temperature is defined as a function of the air temperature, and its qualities are discussed. It is shown that ice is formed first in the small sheltered bays, then in the archipelagos, and finally in the open sea off the coast. It is assumed that the requisites for ice formation may be characterized by a value of a constant with inverse dimension time and the corresponding series of the function of air temperature. A close relationship is found between ice formation and a function of a variable quantity, obtained from the original inverted time constant. The definition of normal date of ice formation is combined with that of normal temperature by computing the mean value of the variable at the ice formation in question, and the normal date of this mean is de-

rived from the normal temperature. The prognostic use of the variable is discussed to illustrate the relation between the temperature prognosis and the ice forecast.

SIP U5522

Sauberer, Franz and Inge Dirmhirn
THE RADIATION BALANCE OF HORIZONTAL GLACIER SURFACES ON THE HIGH SONNBLICK. (Der Strahlungshaushalt horizontaler Gletscherflächen auf dem hohen Sonnblick; Text in German). Geografiska Annaler, 34:261-290 incl. tables, graphs, 1952. 29 refs.
DLC, G25.G4, v. 34

The radiation balance at an elevation of 3000 m. was determined by measuring solar, diffuse sky and global radiation, albedo, and effective outgoing radiation. Daily sums of each type were determined for various degrees of cloudiness. Instruments used included a Büttner actinometer, Ångström pyranometer and pyrgeometer, and various types of radiation balance meters. It is shown that the radiation balance is not simply dependent upon sunshine duration, but greatly upon albedo. It is recommended that albedo and glacier surface temperature measurements be made. Radiation balance curves indicate that with low albedo values the daily balance is negative only during winter with a cloudless and half-covered sky. The daily balance with a cloudless sky and high albedo values is negative throughout the entire year, and increases towards positive values with increasing cloud cover. Albedo variations are attributed to structural changes of the glacier surface.

SIP U5523

Hadley, W. A. and Raymond Eisenstadt
MOISTURE MOVEMENT IN SOILS DUE TO TEMPERATURE DIFFERENCE. Heating, Piping and Air Conditioning, 25, No. 6:111-114 incl. illus. graphs, June 1953. 2 refs.
DLC, TH7201.H45, v. 25

A simulated soil made of glass beads 0.01 in. in diam. and a radioactive tracer technique were used to determine whether the moisture transfer was in liquid or vapor form. A critical moisture content of about 4% moisture by weight of the total dry weight separates liquid from vapor movement in the soil. The water moves from the hot to the cold point in the form of liquid water in wet soils. The increase in water content coincides roughly with the ice point and no moisture movement is apparent when the temperature is kept above 32°F. The moisture moves in the form of vapor in soils containing less than 4% water and is not associated with freezing. A high water content is characteristic of permafrost. Reducing the moisture to less than 4% might eliminate all the permafrost problems.

SIP U5524

Glennen, Edward J.
THE PROBLEMS OF PERMAFROST. Western Construction, 28, No. 4:72-73 incl. illus. April 1953.
DLC, TA1.W44, v. 28

Site selection to permit a large percentage of construction on non-frost susceptible materials saves construction time. The characteristics of underlying soils must be accurately determined, the depth of exploration varying with the size and importance of the building. It is assumed that the initial volume reduction which would occur when heat from the building thaws the underlying material, will be made when the area under a building is thawed and that no additional settlement will occur. Thawing by means of steam points and compacting by blasting the permafrost are recommended. Overlying soil not suitable as foundation material is usually removed. Pile foundations used when a thick layer of frost-susceptible material is present are discussed.

SIP U5525

Itoo, K.
FORMS OF ICE CRYSTALS IN THE AIR. Papers Meteorol. Geophys. (Japan), 3:207-216 incl. illus. diagrs. Jan. 1953. 5 refs.
DWB, Unbound periodical

Atmospheric ice crystals are classified on the basis of microphotographical observations made in Hailar (Manchuria). The classification comprises 4 distinct groups: hexagonal twin prism, hexagonal prism (needle-like), hexagonal plate, and a miscellaneous group subdivided into hexagonal prism, hexagonal pyramid, hexagonal prism with pyramid at one end, combined hexagonal prism, combined hexagonal prism with pyramid at one end, hexagonal prism with both ends flat and plate-like, and amorphous.

SIP U5526

Committee on Steel Pipe Research
STEEL PIPE SNOW MELTING AND ICE REMOVAL SYSTEMS. 31p. incl. illus. tables, diagrs. [n.d.]
SIPRE files

The major advantages of snow-melting systems are enumerated. Factors involved in the design of a snow-melting system such as the area to be served, the heat and hydraulic requirements are discussed. Heat requirements vary from 130 B.t.u./hr./sq.ft. in areas of mild requirements to 260 B.t.u./hr./sq. ft. in areas of greater demands. Water-ethylene glycol solutions are most generally used as circulating fluid, the proportion depending on the lowest temperature to be expected. Calculations to determine the hydraulic requirement are presented. The source of heat, the pipe circuits, venting, drains, controls, and methods of installation are discussed. Installation costs range from $0.80-$1.50/sq. ft. and operating costs from $0.07-$0.15/1000 sq. ft. for each inch of snow melted.

SIP U5527

Dücker, A.
FROST ACTION EFFECTS ON COHESIVE SOILS. (Frosteinwirkung auf bindige Böden; Text in German). p.111-126 incl. illus. tables, graphs. (In: Strassenbau-Jahrbuch 1939/1940, Berlin, Volk & Reich Verlag, Jan. 1940). 10 refs.
DLC, TE3.S77, 1940

Clay soils of the same grain structure often have different physical properties. Clays are hydrous aluminum silicates containing grains less than 2 μ in size. Physical constants, such as compression coefficient, values for permeability and plasticity, are determined by the moisture capacity of the mineral components of the clay, as well as the kind and amount of negative ions adhering to the crystalline surface of the clay minerals. Tests were conducted to determine whether the same factors influence frost action of cohesive clay soils. Two heave-susceptible materials and 4 substances not susceptible to heaving were frozen with and without mixtures of ground quartz and clay minerals in different proportions. Frost heaving was measured at 5-min. intervals and recorded graphically. Test results indicate that the amount of frost heaving per unit of time is dependent on the type of clay mineral and the quartz content. No direct relationship exists between frost heaving and permeability. An increase in water absorption of specific mineral and quartz mixtures tends to decrease frost heaving. Horizontal ice layers form in freezing pure kaolinite soils and polygonal ice crystals in pure and quartz-containing montmorillonite soils. All types of clay soils are frost susceptible and must be treated in road construction.

SIP U5528

Reinbold, O.
CONTRIBUTIONS TO THE PROBLEM OF ICING IN AERONAUTICS. (Beiträge zum Vereisungsproblem der Luftfahrt; Text in German). Meteorologische Z. 52:49-54 incl. tables, graphs, maps, Feb. 1935. 9 refs.
DLC, QC851.M3, v. 52

The icing phenomenon is analyzed climatologically and synoptically. The monthly frequency of ice formation is tabulated for Germany and the U. S. A maximum occurs in Dec., a minimum in June, and approximately 11.2% of all ascents during a year result in ice formation. Icing in Germany occurs most frequently in stratus clouds; icing in the U. S. is most frequent in strato-cumulus. Cloud thickness and position, wind direction, and relative humidity are discussed on the basis of icing frequency. Results indicate that instabilities in spatial distribution of specific meteorological elements are present in each case of ice formation.

SIP U5529

Sedlmeyer, Karl Ad.
RIVER ICE AND WASTE WATER. (Flusseis und Abwasser; Text in German). Meteorologische Z. 52:79-80 incl. illus. diagr. Feb. 1935.
DLC, QC851.M3, v. 52

Polygonal, trough-shaped ice formations near a weir on the Moldan river with depressions in the center and a red ice-crystal surface were observed. The formations became dome-shaped upon thawing and consisted of a soiled, reddish powder with the edges consisting of granular ice. The formations are attributed to eddy currents. Microscopic examinations of the powder indicated that it consisted of cellulose particles from waste waters originating from paper factories along the river. The water is purified when these particles are frozen into the ice, and are dispersed as the result of the greater flow velocity of the surface water.

SIP U5530

Renier, H.
DEPTH AND DURATION OF THE SNOW COVER IN THE RIESENGEBIRGE. (Höhe und Andauer der Schneedecke im Riesengebirge; Text in German). Meteorologische Z. 52:90-97 incl. tables, graphs, March 1935. 2 refs.
DLC, QC851.M3, v. 52

Snow depth data for each of 7 stations located at elevations from 437-1602 m. are tabulated and compared. The limit for a steady winter snow cover is found at an elevation of 650 m.; above this limit snow depths of 50 cm. are exceeded each year, and the maximum depth is regularly expected during the second half of winter. The snow cover duration increases rapidly with increasing elevation. The probability of the presence of a snow cover of specific depth of various elevations is indicated from a tabulation of the number of days per month for snow depths of 10, 20, 30, and 40 cm. The development of the snow cover from the end of Sept. to early May is traced.

SIP U5531

Aujeszky, L.
SNOWFALL AT HIGH AIR TEMPERATURE. (Über Schneefall bei hoher Lufttemperatur; Text in German). Meteorologische Z. 52:101-103, March 1935. 15 refs.
DLC, QC851.M3, v. 52

Necessary and sufficient conditions for snowfall at positive air temperatures include the existence of a negative temperature in the precipitation-forming layer, rapid traversing of the positive temperature layer by the snow crystals without melting, and the existence of a significant vertical temperature decrease. Snowfall at especially high air temperatures can occur only in precipitation of the shower type. The use of direct or indirect aerology in verifying this type of precipitation is discussed.

SIP U5532

Kassner, C.
THE FREEZING OF LAKE CHAMPLAIN FROM 1816 TO 1935. (Das Zufrieren des Lake Champlain von 1816 bis 1935; Text in German). Meteorologische Z. 52:333-335 incl. tables, Sept. 1935. 1 ref.
DLC, QC851.M3, v. 52

Dates of freezing of Lake Champlain covering a period of 120 years are analyzed. It is shown that 85 of the freezing dates occur between Jan. 15-Feb. 11. A gradual retarding of the freezing date since 1860 was observed, and might possibly be attributed to an increase in lake traffic.

SIP U5533

Sverdrup, H. U.
THE HEAT BALANCE OF GLACIERS ON WEST SPITZBERGEN. (Zum Wärmehaushalt der Gletscher auf West-Spitzbergen; Text in German). Meteorologische Z. 52:495, Dec. 1935. 1 ref.
DLC, QC851.M3, v. 52

The heat supplied to the firn was determined by recording the melting. Heat supplied by radiation processes was calculated from observations of insolation and albedo. Wind speed, temperature and humidity were measured hourly at 3-4 heights. A heat exchange coefficient was derived as a function of the extrapolated wind speed at a height of 1 cm. and of the height. (See also SIP U276)

SIP U5534

Geiger, Rudolf
THE RELATIONSHIPS OF FALLING PRECIPITATION TO AIR TEMPERATURE. (Über die Beziehungen des fallenden Niederschlages zur Lufttemperatur; Text in German). Meteorologische Z. 61: 145-151 incl. tables, graphs, May 1944. 2 refs.
DLC, QC851.M3, v. 61

A statistical analysis is made of various forms of precipitation and air temperatures. A European norm was obtained by utilizing the daily weather reports of all European stations from Nov. to April for a period of 10 yr. The maximum of the frequency distribution of air temperature was formed at 4°C. The frequency of the different forms of precipitation is found for all solid forms, all forms below 0°C, and all solid forms above 0°C. The change of precipitation form in the vicinity of the freezing point is indicated.

SIP U5535

Ahlmann, Hans W:son
SCIENTIFIC RESULTS OF THE NORWEGIAN-SWEDISH SPITSBERGEN EXPEDITION 1934. PART V: THE FOURTEENTH OF JULY GLACIER. Geografiska Annaler, 17:167-218 incl. illus. tables, graphs, maps, 1935. 28 refs.
DLC, G25.G4, v. 17

The ablation of the glacier was computed for the period May 31-Sept. 15, 1934 on the basis of measurements taken from June 20-Aug. 18. Temperature measurements of the snow and ice of the glacier indicate no storage of the previous winter's low temperatures in the firn on Aug. 1. The temperature was at the f.p. everywhere as is characteristic of temperate types of glaciers. Calculations of ablation and accumulation indicate that the economy of the glacier is considerably more sensitive to changes in the ablation than in the accumulation. Temperature and wind speed, as dominant factors of ablation, are thus of major importance to glacier economy. Data are presented which indicate that the Fourteenth of July Glacier was receding in 1906, was stagnant from 1922-1928, and had a negative economy in 1934. The rate of movement of the glacier is described as slow, possibly due to its regressive state. The economy of the Fourteenth of July Glacier is compared to that of 13 other arctic glaciers.

SIP U5536

Damm
CONSIDERABLE, BUT AVOIDABLE FROST DAMAGES TO A STRUCTURE. (Schwere, aber vermeidbare Frostschäden am Bau; Text in German) Umschau, 44:682-685 incl. illus. Oct. 27, 1940.
DLC, AP30.U5, v. 44

A variation of damages to buildings caused by frost action is indicated. It is suggested that pilings be driven 1.2-1.3 m. into the ground in order to remain below the frost line.

SIP U5537

Kudri͡avt͡sev, V. A.
DYNAMICS OF PERMAFROST IN THE BASIN OF THE MIDDLE REACHES OF THE SELEMDZHA RIVER AND CONSTRUCTION POSSIBILITIES IN THIS REGION. (Dinamika vechnoĭ merzloty v basseĭne srednego techeniĭa reki Selemdzhi i svi͡azannye s neĭ usloviĭa stroitel'stva v etom ra͡ĭone; Text in Russian with English summary). Trudy Komiteta po vechnoĭ merzlote, 8:81-117 incl. tables, graphs, diagrs. 1939. 1 ref.
DLC, S599.R9A7, v. 8

A general description of the occurrence and nature of permafrost and climatic conditions is presented. A degradation process of permafrost was observed in this region, and is attributed to the favorable heat balance in the soils devoid of vegetation and exposed to insolation. Investigations indicate that degradation of permafrost is detrimental to construction in the area. Other factors considered are the lithology of quaternary formations, water content, soil composition, and relief. Degradation and ground ice produce polygonal structures, stripes, and pits. Retardation of the degradation is recommended for construction purposes in the area.

SIP U5538

Kushev, S. L.
MORPHOLOGY AND GENESIS OF MOUND FORMATIONS AND THEIR GEOGRAPHICAL DISTRIBUTION. (Morfologiĭa i genesis bugristykh mareĭ i ikh geograficheskoe rasprostranenie; Text in Russian with English summary). Trudy Komiteta po vechnoĭ merzlote, 8:119-161 incl. illus. tables, diagrs. 1939. 31 refs.
DLC, S599.R9A7, v. 8

Microrelief formations occurring in forest zones of permafrost regions are described. The mounds are formed by hydrostatic pressure resulting in mechanical deformations during the freezing process in winter. Cemetery hummocks, spot medallions, pingos, and bowl-like hollows are described. The depth of the upper boundary of permafrost, varying from 0.80-2.50 m., is determined by such factors as: insolation, air temperature, elevation, relief, soil composition, vegetative cover, hydrological and hydrogeological conditions. The mound formations are classified into moss, hillocky, hillock-moss, moss-hillock, mixed and forest formations. Included are stone polygons on stony substratum, spotty tundra, mounds and blisters on clayey and sandy soil with rubble and peat mounds on peat material. Stone polygons occur in the arctic, subarctic and high mountain zones; spotty tundras in the subarctic and high mountain zones; frost and peat mounds in the subarctic and temperate zone.

SIP U5539

Knuth, Eigil
THE DANISH EXPEDITION TO PEARY LAND, 1947-49. Geographical J. 118:1-11 incl. illus. map, discussion, March 1952.
DLC, G7.R91, v. 118

A general description of Peary Land including meteorological and biological characteristics is given. Eskimo artifacts found, were photographed and evidence of past occupance is described. The sunshine recorders registered more sunny hours from April 9-Sept. 5 than is observed during the whole year in Denmark. Night frost did not occur during a period of 2.5 months. Melting of snow and ice proceeded day and night. Ice, 7.5 ft. thick in May on Brønlund Fjord at 82°N. lat. broke up around July 13, two weeks earlier than at the South Base near Clavering Island at 74°N. lat.

SIP U5540

Baird, P. D.
THE BAFFIN ISLAND EXPEDITION, 1950. Geographical J. 118:267-279 incl. illus. map, discussion, Sept. 1952.
DLC, G7.R91, v. 118

The biological, geological, and glaciological purposes of the 1950 Baffin Island Expedition are presented and the scientific results are summarized. Attempts were made to record flow data by sinking a tube into the ice cap. The experiment failed due to low ice temperatures varying from -10° to -14°C. The deepest hole achieved was 70 ft. Only 1 m. of snow covered solid ice in the firn at the central ice-cap camp and at the highest point of the ice cap. A 5-in. growth of the ice cap occurred in the higher regions during the summer by direct refreezing of the melting snow. The results of 3 radial traverses indicate an ice thickness up to 1500 ft.

SIP U5541

Harland, W. B.
THE CAMBRIDGE SPITSBERGEN EXPEDITION, 1949. Geographical J. 118:309-331 incl. maps, appendices I-III, discussion, Sept. 1952.
DLC, G7.R91, v. 118

An account of geological explorations to evaluate the economic potentialities of the British properties of central Vestspitsbergen is presented. Systematic work on soil polygons was initiated as a subsidiary research project. A total of 38 soil thermometers were inserted to different depths in systematic positions in 3 neighboring polygons. Readings throughout 48 hr. in Sept. reveal an orderly pattern of changes throughout the polygons. A description of the equipment and the rations used on the expedition is given. An 11-ft. Nansen sled was efficient with heavy loads on snow; a 6-ft. sled with a low center of gravity proved useful on glacier ice.

SIP U5542

MacCarthy, Gerald R.
RECENT CHANGES IN THE SHORELINE NEAR POINT BARROW, ALASKA. Arctic, J. Arctic Inst. North Am. 6, No. 1:44-51 incl. illus. table, map, March 1953. 3 refs.
DLC, G600.A695, v. 6

The rapid erosion of the coastal segments near Point Barrow (Alaska), even though protected from wave action by sea ice for at least half of the year, is discussed. The variations of the distance of the shore line to 17 triangulation stations, from 1945-1951 are tabulated. Cliff erosion is aided and accelerated by the presence of ground ice. Melting ground ice reduces the coherency of the cliff face and lubricates the mass of unstable material. The effects of polygonal ground, breaking off along the lines of ice wedges, are discussed.

SIP U5543

Black, Robert F.
PERMAFROST - A REVIEW. Trans. N. Y. Acad. Sci. Ser. II, 15:126-131 incl. table, map, March 1953.
DLC, Unbound periodical

About 24% of the total land area of the earth is in areas of permafrost. The relative age, type, and proximity of permafrost to the surface are correlative with vegetation and drainage. Thickest in the continuous zone of permafrost that has not been glaciated, permafrost reaches a maximum depth of 2000 ft. at Nordvik (northern Siberia). Average thickness in the continuous zone is 800-1200 ft. in Alaska, and 1000-1500 ft. in northern Siberia; in the discontinuous zone in Alaska, 200-400 ft.; in the sporadic zone in Alaska, less than 100 ft. Permafrost is several thousands ft. thick in Greenland and Antarctica ice caps. Temperatures at 30-50 ft. depth are below -5°C in the continuous zone, from -1° to -5°C in the discontinuous zone, and above -1°C in the sporadic zone. Methods of dis-

tinguishing supersaturated, saturated, and undersaturated permafrost material in the field with the aid of a hand lens are given. Ice is an important component of permafrost. Individual crystals in ground ice range from 0.0001-70 cm. Ice wedges in the continuous zone of permafrost vary from less than 1 mm. in width to more than 25 ft. in width and length. These wedges join in polygonal networks. Petrofabric studies of ice wedges are discussed.

SIP U5544

Marshall, J. S. and K. L. S. Gunn
MEASUREMENT OF SNOW PARAMETERS BY RADAR. J. Meteorology, 9:322-327 incl. graphs, Oct. 1952. 12 refs.
DLC, QC851.A283, v. 9

An analysis of radar observations on snow indicates a fairly good correlation between the sum Z of the sixth powers of the diam. and the rate R of the snowfall. Equal precipitation rates R give equal values for Z with snow as with rain. The transition at the melting level, in the radar bright band, from snowflakes above the bright band to raindrops below is discussed. The size distribution of rain must have a greater proportion of larger drops than for snow. An increase in particle mass by rapid aggregation of raindrops and wet snowflakes in the melting region is suggested. Size distributions for precipitation are exponential when plotted as number against diam. The exponentials vary consistently with R for rain but not for snow. A simultaneous measurement of Z and R is required to establish the distribution for snow. An attempt to relate the calculated distribution curves to the synoptic situation is made.

SIP U5545

Moorhead, David L.
LANDING ON THE POLAR ICECAP. Proc. U. S. Naval Inst. 78:41-43, illus. Jan. 1952.
DLC, V1.U8, v. 78

A flight with a ski-equipped plane from Point Barrow (Alaska) to an ice stretch 300 mi. northeast required a 1-hr. pre-heating of the engines through flexible tubes pushed into openings in the engine cover. Freezing of the glass bubble in the top of the fuselage during the flight was eliminated by blasting hot air through a flexible tube wound into the dome. Determination of the degree of aircraft drift below 1000 ft. was facilitated by observing snowdrifts perpendicular to the wind direction. Pressure ridges, 40-50 ft. high, were observed in the Arctic Ocean. Landing on a previous site was accomplished with the assistance of electronic experts. Size and thickness of the surrounding pressure ridges, nearness of a lead, thickness of the ice edge along the lead, snow accumulation and ice color are criteria for a safe landing site. The ice thickness is investigated immediately after landing by cutting through the ice with a power-driven ice saw and the plane engines are cut only if the ice is thick enough.

SIP U5546

Langleben, M. P. and K. L. S. Gunn
SCATTERING AND ABSORPTION OF MICROWAVES BY A MELTING ICE SPHERE. Scientific Rept. MW-5 McGill U. MacDonald Physics Lab. 12p. incl. graphs, appendices 1-5, March 1952. 10 refs. (Contract No. AF-19 [122]-217)
DLC, T.I.D. U23131

Computations of the scattering and absorption of electromagnetic waves by melting ice spheres at wave lengths of 0.9, 3, and 10 cm. are presented. Ice spheres, thinly coated with water and small with respect to the wavelength of incident microwave radiation, scatter like all-water drops of the same mass. The loss factor can be neglected in scattering computations for wave lengths larger than 5 cm. Cross sections increase rapidly when the particles begin to melt. A water film equal to 10% of the total radius increases the reflectivity to 91, 88, and 76% of that for an all-water drop at wave lengths of 10, 3, and 0.9 cm. respectively. The scattering increases more rapidly from a water-coated ice sphere than from a melting homogenous mixture of ice and water. The loss factor must always be retained in attenuation computations. The greatest amount of energy is absorbed from the incident radiation when the ice particle is 10-20% melted, and this attenuation is twice that for a completely melted particle.

SIP U5547

Cox, Duncan B. and John L. Cox
THE DEVELOPMENT OF ELECTRICALLY HEATED AIRCRAFT PROTECTIVE COVERS. Wright Air Development Center. AF Tech. Rept. No. 6405, 37p. incl. illus. graphs, diagrs. Oct. 1952. (Contract No. AF 33 [600]-17211)
DLC, ASTIA AD8447

The heat requirements to prevent ice accretion on the wing surface under varying conditions of temperature, wind, and precipitation are analyzed, and a required heat distribution pattern is evolved. Available materials for the construction of the cover and for the heating elements are studied. A feasible system for thermostatic control to affect power-saving is developed. The final design is based on neoprene-impregnated nylon fabric with a thermowire heating grid of variable direction and spacing. The heating elements are cemented to biased tape, which in turn is cemented to the cover. Thermostatic control of areas of like heating dissipation is provided. The design is directed at an optimum combination of safety and efficiency in performance. (Authors' abstract)

SIP U5548

LE TOURNEAU MAKES TIME STUDIES IN SNOW REMOVAL TESTS. Pacific Builder and Engineer, 58, No. 9:71 incl. illus. Sept. 1952.
DLC, TH1.P2, v. 58

A Super C Tournadozer, a rubber-tired tractor, equipped with a V-plow and wing, plowed and cast

snow off the highway while traveling in third and fourth gear. The Tournadozer was found to deliver great impact at high speed. A Tournapull "D" Roadster averaged 110 sec. to clear lanes averaging 217 ft. in length.

SIP U5549

Bandel, Herman W.
CORONA FROM ICE POINTS. J. Applied Phys. 22:984-985 incl. illus. graphs, diagr. July 1951. 4 refs.
DLC, QC1.J83, v. 22

The effect of ice points in initiating a discharge in air was investigated by studying the positive and negative point-to-plane corona. Points of 1 mm. diam. and point- to-plane of 8 cm. gap length were used and the results compared with those obtained under similar conditions with a standard 1 mm. diam. Pt. point. The ice points yield corona with positive and negative points. Positive and negative corona onsets are not far different from those for the equivalent metal point. The currents after corona onset rose only to 5×10^{-12} amp. for distilled water points and 10^{-9} amp. for tap water ice. The ice point gives positive corona of the burst pulse or streamer type at about the same potential as the equivalent metal point. Amplitudes are reduced by the high resistance of the ice point. Ice, in contrast to water, has a secondary electron emissive power and ice coronas will not lead to a lowered threshold for spark breakdown because the high resistance of the ice prevents the development of streamer distortions leading to sparks.

SIP U5550

Vercelli, Francesco
THE MOVEMENT OF GLACIERS. (Il moto dei ghiacciai; Text in Italian). Scientia, 86:13-19, 1951. 6 refs.
DLC, Q4.S4, v. 86

Glacier movement is measured by mark posts placed in transversal lines across the glacier. It was found that the maximum velocity of movement occurs in the center, the minimum at the sides, and that velocity decreases also towards the bottom. Modern glaciology assumes that rigid and plastic properties coexist in ice, that rigid characteristics appear in rapid phenomena, and plastic ones in geologically slow developments. Somigliana's theory of glacier movement considers glacier ice as a viscous fluid of low compressibility flowing in a bed of cylindrical form and uniform inclination, with a constant viscosity coefficient, which may be represented by the equation valid for viscous fluids in an inclined capillary tube. The equation establishes geometrical and physical relationships between measurable elements on the surface and relative elements in the interior so that the depth of the glacier may be calculated when the distribution of the surface velocity in a transversal section is known. Large glacier fluctuations are part of the climatic variations in the course of centuries, and are believed to depend on solar rhythms.

SIP U5551

Weightman, R. H.
SNOW COVER IN SOUTHERN CANADA AS RELATED TO TEMPERATURES IN THE NORTH ATLANTIC STATES AND THE LAKE REGION. Monthly Weather Rev. (U. S.), 59:383-386, tables, maps, Oct. 1931.
DLC, QC983.A2, v. 59

Data of the depth of snow on the ground at the end of March in southern Canada and temperature departures in the U. S. for April are indicated. The study is confined to the years 1916-1928. It is concluded that there is little consistent relationship between snow cover at the end of March and April temperatures immediately south of the Canadian border line.

SIP U5552

Fraser, D., C. K. Rush and D. Baxter
THERMODYNAMIC LIMITATIONS OF ICE ACCRETION INSTRUMENTS. Bull. Am. Meteorological Soc. 34:146-154 incl. graphs, appendices A-B, April 1953. 6 refs.
DLC, QC851.A6, v. 34

Instruments, measuring the rate of accretion of ice on an unheated body to determine the supercooled water content of an icing cloud, are assessed. A limit of water concentration beyond which some of the water impinging on an unheated body will not freeze exists for any given icing condition. Theoretical values of these limits are calculated for a 0.125-in. diam. non-conducting rotating cylinder. Such a cylinder is of limited usefulness at flight speeds of 200-300 ft./sec. and is useless at higher speeds. Experimental results confirm these facts. Both a thermal method and an ice-accretion method must be used to determine the supercooled water concentration in icing clouds, until a practical method of refrigerating ice-accretion instruments is developed.

SIP U5553

Thomas, W. N.
THE USE OF CALCIUM CHLORIDE OR SODIUM CHLORIDE AS A PROTECTION FOR MORTAR OR CONCRETE AGAINST FROST. Special Rept. No. 14, Building Res. Dept. Sci. Ind. Res. 30p. incl. tables, Oct. 1929. 27 refs.
DLC, TA435.T5

$CaCl_2$ and NaCl, added to the mixing water of a portland cement, afford limited protection against frost during early settling and hardening. This protection may be due to the ability of the salts to lower the f.p. of the wet mixture, increase the rate of evolution of heat during setting, and to hasten the setting and hardening processes. NaCl may cause efflorescences on the face of the concrete, $CaCl_2$ tends to produce discolorations, and both cause corrosion of reinforcing metal. Tests show that concrete containing NaCl sustains a serious loss in strength.

The action of $CaCl_2$ varies from increases to decreases in strength, and seems to depend on the brand of portland cement, the richness and consistenc of the mixture, and the temperature and conditions of curing. $CaCl_2$ should only be used after trial runs with materials and conditions identical with those anticipated in practice. The admixture of $CaCl_2$ or NaCl is not recommended with aluminous cements.

SIP U5554

Maclean, D. J.
THE EFFECT OF THE SOIL FOUNDATION ON THE ROAD SURFACE. AN OUTLINE OF EXISTING KNOWLEDGE. Road Res. Tech. Paper No. 11, Road Res. Lab. Dept. Sci. Ind. Res. 19p. incl. illus. graphs, diagr. 1948. 8 refs.
DLC, G.P.R.R.

Ways in which the soil foundation of a road can cause irregularities, cracks, and other defects in the road surface are discussed. The deterioration of the subgrade by frost action is analyzed. The maximum depth of frost penetration during the severe winter of 1947 was 14 in. Subgrades remained unaffected where the road thickness was over 14 in. The surfacing of bituminous roads should remain impermeable to minimize frost action. Bases composed of chalk, limestone and brick suffered the most damage. Roads constructed on frost-susceptible subgrades should have a thickness based on the depth of frost penetration if this exceeds that required for stability to traffic.

SIP U5555

Croney, D., J. D. Coleman, and Pamela M. Bridge
THE SUCTION OF MOISTURE HELD IN SOIL AND OTHER POROUS MATERIALS. Road Res. Tech. Paper No. 24, Road Res. Lab. Dept. Sci. Ind. Res. 42p. incl. illus. tables, graphs, diagrs. 1952. 7 refs.
DLC, G.P.R.R.

Methods for measuring the suction or reduced pressure at which the moisture is held in soil and the relationship between suction and moisture content are described. The methods, each suitable for a limited part of the wide range of suction are used to study the factors governing the movement and distribution of water in soil. The direct methods in which an external suction of known magnitude is applied to the material under test include the suction plate and tensiometer methods in the 0-1 atm. range, the centrifuge method from 1-30 atm., the pressure membrane method from 0-10 atm., and the consolidation method from 0.1-10 atm. The indirect methods involve the thermodynamic relationships between the suction of held water and its f.p. and vapor pressure depressions and include the f.p. method in the 1-10 atm. range and the vacuum dessicator and sorption balance methods in the 30-10^4 atm. range. The electric methods are of limited accuracy but are usable directly in the field. The f.p. depression method is based on the fact that the water in porous materials freezes at a temperature lower than the normal f.p. of water. An equation relating the f.p. depression to the suction of the moisture in a porous material is presented, and the relationship plotted. The apparatus used to measure the f.p. depression is described. The limitations of the f.p. depression method which restrict its use in civil engineering research are discussed.

SIP U5556

Taber, Stephen
FREEZING AND THAWING OF SOILS. Military Engr. 45:198 incl. illus. May-June 1953. 1 ref.
DLC, TA1.P85, v. 45

Frost heaving of soils and most pressure effects accompanying freezing water are due to the growth of ice crystals and not to an increase in volume. The direction of crystal growth is determined by the direction of cooling. Ice crystals in fine grain soils are supplied with water drawn from below with which layers, lenses, and veins of relatively pure ice are formed, resulting in more ice in the frozen soil than there was water before freezing. Ignorance of the mechanics of the freezing and thawing of soils was responsible for much trouble along the Alaska Highway. Excessive frost heaving in most places can be prevented by proper drainage. Accurate information on the maximum depth of thawing in permafrost and freezing in warmer regions on temperature profiles of deep wells in frozen ground, the seasonal range of subsurface temperatures, and data on the thermal properties of soils are needed to determine the remedies to be adopted in solving engineering problems due to freezing and thawing.

SIP U5557

Bentley, Wilson A.
STUDIES OF FROST AND ICE CRYSTALS. Monthly Weather Rev. (U. S.), 35:348-352, 397-403, 439-444, 512-516, 584-585 incl. tables, Aug. Sept. Oct. Nov. Dec. 1907. 4 refs.
DLC, QC983.A2, v. 35

The 2 methods described for photographing frost and ice crystals are: oblique light with low magnifying powers, and direct transmitted light with a 0.5 in. microscope objective. Hoarfrost crystals are discussed in terms of general atmospheric conditions for formation, the nuclei and surfaces on which they form, the effects of environment and nuclei, their internal structure and growth habits, and the differences between frost and snow-crystal growth. Formation of window-frost crystals, and their relation to foreign substances, temperature, humidity, and water droplets are analyzed. The formation and development of window-ice crystals, the merging of ice crystals into massive ice, the formation of hail, and the structure of hailstones are described. The classification presented includes 13 types of hoarfrost crystals, 11 types of window-frost crystals, 2 types of window-ice crystals, and 6 types of ice crystals.

SIP U5558

Fletcher, Joseph O.
THREE MONTHS ON AN ARCTIC ICE ISLAND.
Natl. Geographic Mag. 103:489-504 incl. illus. map, April 1953.
DLC, G1.N27, v. 103

T-3, a huge mass of ice which broke off an ancient glacier on Ellesmere Island, has been drifting in the polar basin since 1946, traveling at about 2 mi./day. T-3 is a 150 ft. thick slab of fresh water ice, 4 mi. wide and 9 mi. long. The first landing and the subsequent establishment of an air weather service and geophysical research base are described. Wind is the main cause of drifting. Temperatures and salinity were measured at various depths in the Arctic Ocean. Soundings revealed that the ocean bottom is generally flat, is located more than 12,000 ft. below the surface, and occasional mountains rise within 7000 ft. of the surface. The reciprocal effects of ice and air temperature are being studied. Weather information and broadcasts are made every 6 hours. Coring bits driven down 52 ft. disclosed 54 distinct dirt layers.

SIP U5559

Oreshnikova, E. I.
INVESTIGATIONS OF GLACIERS OF THE ELBRUS REGION DURING 1932-33. (Ledniki El'brusskogo raĭona po issledovaniĭam 1932-1933 gg.; Text in Russian with English summary). Trudy Lednikovykh Ekspeditsiĭ, 5:239-299, 484-485 incl. illus. tables, diagrs. 1936. 43 refs.
DLC, Q115.I62R8, v. 5

Observations showed that the snow-line boundary is located at elevations of 3200-3600 m. above sea level. The lower boundary was observed on the eastern slopes, and the higher one on the western slopes. Observations of the Bolshoi Azan Glacier during 1849-1933 indicated a recession of about 640-850 m. up to 1873. The annual value of recession was determined to be 14 m. A small advance of some glaciers on the northern slopes of Mt. Elbrus occurred from 1927-32. The recession is attributed to an increase in the mean annual and summer temperatures and a decrease in precipitation.

SIP U5560

Rutkovskaĭa, V. A.
GLACIERS OF THE UPPER SVANETYA. (Ledniki Verkhneĭ Svanetii; Text in Russian). Trudy Lednikovykh Ekspeditsiĭ, 5:404-464 incl. illus. tables, diagrs. 1936. 34 refs.
DLC, Q115.I62R8, v. 5

Svanetya is located on the southern slope of the main Caucasus mountain range and is characterized by extensive surface glaciation in the upper part. A large number of glaciers (up to 130) are attributed to orographic peculiarities of the region which is open only to the humid westerly and south westerly winds with an annual amount of precipitation of about 1500 mm. The snow-line limit lies between 3000-3300 m. above sea level. Observations since 1887 showed that the glacier surfaces have decreased by 750-1250 m. at elevations of 1000-1700 m. and by 150-200 m. at elevations above 2500 m.

SIP U5561

Ivanov, V.
AIR HOAR. (O'tverdom nalete; Text in Russian). Zhurnal Geofiziki, 1:259-261 incl. illus. table, 1931.
DLC, QC801.Z52, v. 1

Air hoar was observed in Omsk on Jan. 9-13, 1930. It is believed that air hoar is a formation of ice crystals sublimated from warm, humid air on stone walls and other good conductors of heat after freezing weather. The structure of the crystals resembles that of hoarfrost. Intensive formations of air hoar were observed on stone walls of unheated buildings following long periods of air temperatures below -20°C, accompanied by a change in wind direction and rising air temperatures. The air hoar did not sublimate on outside corners and ornaments of the buildings.

SIP U5562

Skachkov, B. I.
SYSTEM OF HYDROLOGIC REGIONALIZATION. (Skhema gidrologicheskogo raĭonirovaniĭa; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 2:32-36, 1934.
DLC, GB746.S75, v. 2

The peculiarities of macrostructure of the area were used as an index for regionalization. The physiographical characteristics of 10 regions are presented. Permafrost extends from the Canin peninsula to the northern Urals, a tundra region, about 50-60 m. above sea level. Permafrost together with severe climate affect a specific water regime in rivers resulting in overabundance of water in spring and a stagnant state in winter when rivers are frozen to the bottom.

SIP U5563

Zhukov, V. F.
FROST FISSURES IN THE PERMAFROST REGIONS. (Morozobolnye treshchiny v raĭonakh vechnoĭ merzloty; Text in Russian with English summary). Trudy Instituta Merzlotovedeniia im. V. A. Obrucheva, 4:226-229 incl. graphs, diagrs. 1944.
DLC, Slavic unclassified

Extremely low temperatures produce frost fissures on snow-free soil in autumn. Such fissures were observed in the Transbaikal region in March at air temperatures ranging from 0°C in the daytime to -30°C at night. Vertical fissures were found in homogeneous soils. In layered soils the fissures followed the lines of cleavage. Frost fissures may occur in building foundations whenever the foundation and the soil are solidly frozen together.

SIP U5564

Tsyplenkin, E. I.
AGRICULTURAL IMPORTANCE OF PERMAFROST. (Vechnaia merzlota i ee agronomicheskoe znachenie; Text in Russian with English summary). Trudy Instituta Merzlotovedeniia im. V. A. Obrucheva, 4:230-255 incl. tables, graphs, 1944. 57 refs.
DLC, Slavic unclassified

Permafrost studies were conducted in the Yakut republic for 3 yr. Tables indicate the relationship of a vegetative cover on the depth of freezing, soil moisture retention, and the properties of the soil. Heavy fertilization of the soil is a requisite for plant growth at low soil temperatures. Snow retention to increase the soil moisture content is important. Agricultural techniques must be adapted to conform to climatic characteristics.

SIP U5565

Krasovskiĭ, A. A.
CLIMATE. (Klimat; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 2:19-24 incl. tables, map, 1934.
DLC, GB746.S75, v. 2

The climate of the area south of the White, Barents and Kara seas to 57°N. lat. and between 36°-66°E. long. is described. Mean and extreme data of the period of 1885-1930 are tabulated. Winter lasts about 220 days in the northeastern part of the area and 160 days in the southwest (Vologda province). Low temperatures of -45° to -55°C are common throughout the area. The northeastern part is characterized by the presence of considerable permafrost. The snow cover reaches depths of 100 cm. near the Urals, 70 cm. in the tundra zone, and 50 cm. in the south. Snow melting continues for about 2 months. Meltwater will attain a depth up to 9 mm. in a day in the south and 5 mm. in the north during intensive thawing.

SIP U5566

Chapman, Seville
SOME THUNDERCLOUD ELECTRIFICATION STUDIES. Rept. No. C. A. L. 47, Cornell Aeronautical Lab. Inc. 35p. graphs, diagrs. Oct. 1952. 30 refs.
DLC, ASTIA AD8599

Mechanisms effective in generating electrical charges in thunderclouds were investigated. Experiments were undertaken to study the electrification generated upon the disruption of raindrops and upon impact of snow crystals on one another. Corona points were used to investigate the earth's electric field at the ground during blizzards and modified radiosondes to study the earth's electric field in thunderstorms and in the upper air during blizzards. The magnitude of charge produced varies with the mechanism of drop disruption and varies from drop to drop when disrupted by the same method. The corona current is zero for 90% of the time. The electric field fluctuates widely when precipitation is falling. Thunderstorms are characterized by instantaneous field changes when there are lightning discharges; rain and snow precipitation, by rapid fluctuations in the field. The elementary aspects of a thundercloud electrification theory postulating that charge is generated by the disruption of drops either through a surface phenomenon mechanism or a polarization mechanism in the thundercloud field are investigated.

SIP U5567

Saltykov, N. I.
BUILDING FOUNDATION IN THE BOL'SHEZEMEL'SKAYA TUNDRA. (Fundamenty zdaniĭ v raĭone Bol'shezemel'skoĭ tundry; Text in Russian with English summary). Trudy Instituta Merzlotovedeniia im. V. A. Obrucheva, 4:125-204 incl. tables, graphs, diagrs. 1944. 12 refs.
DLC, Slavic unclassified

Studies of construction problems on permafrost were conducted at the Vorkuta Research Station for 6 yr. The Vorkuta region is a permafrost area in the northeastern part of European USSR. Permafrost extends 45-130 m. in depth with an active layer of 1.0-15 m. Unlike Siberian permafrost regions, the Vorkuta is covered with deep snow. Tables and graphs indicate the thermal regimes of soil under stone and wooden buildings and structural deformations during thawing. Stone buildings settle from 5-30 cm. according to the ice content of the soil. The required depth of foundations for heated buildings can be calculated from the depth of seasonally frozen ground which ranged from 0-3.7 m. Stone buildings are not subject to deformation when erected on concrete piles and a concrete frame over heavy morainic clay soil having a bearing capacity of 1.0-1.5 kg./sq. cm. Heavy construction was satisfactory when the foundations consisted of concrete piles resting on a concrete base of 1.2 x 0.8-m. or 1.4 x 0.8-m. cross sections. Deformation was prevented in wooden structures when the supporting piles were driven into ground replaced by gravel.

SIP U5568

Efimov, A. I.
REGIME OF GROUND WATER IN DEEPLY FROZEN GROUND UNDER HEATED BUILDINGS. (Glubokoe promerzanie gruntov i rezhim nadmerzlotnykh vod pod teplymi zdaniiami; Text in Russian with English summary). Trudy Instituta Merzlotovedeniia im. V. A. Obrucheva, 4:205-225 incl. tables, graphs, 1944. 10 refs.
DLC, Slavic unclassified

The relationship between the depth of seasonal frozen soil and the ground-water level was investigated under 2 heated buildings during the winters of 1941-43 in the southern part of a permafrost area. The permafrost was 4-15 m. thick with an active layer of 3-4 m., had temperatures -0.2 to -0.3°C and moisture contents of 17-40%. The ground-water level

began to increase when seasonally frozen soil reached the water layer. The ground-water level varied between 2.2 m. in March and 3-5 m. in Nov.-Dec. The temperature of the ground water was high enough under buildings to cause thawing of the permafrost. The indications are that the permafrost will be completely thawed within 5-8 yr.

SIP U5569

Shishkin, A. A.
POSSIBILITIES OF WINTER FILLER MASONRY BY THE FREEZING METHOD. (Mozhno li vesti zimnîûû butovuû kladku sposobom zamorazhivaniâ; Text in Russian). Stroitel'naâ Promyshlennost', 16, No. 3:56-57 incl. table, graph, 1938. 1 ref.
DLC, TH4.S85, v. 16

Laboratory experiments showed that winter masonry settled 1-3 mm. on thawing and rapidly increased in strength after thawing. The cementing mixture in stone foundations 50-80 cm. thick cooled from 2-10 hr. at temperatures below -40°C. Thawing occurred within 4-10 days in spring. Summer masonry using thin cementing mixtures settled 0.3-0.7 mm. Relations between settling of filler masonry and strength of cementing mixtures are illustrated graphically. Characteristics of thick and thin limestone mortars are tabulated.

SIP U5570

Bulgakov, A. I.
ON THE CONSTRUCTION OF INDUSTRIAL ENTERPRISES UNDER PERMAFROST CONDITIONS IN ANADYR REGION. (O stroitel'stve promyshlennykh predpriîatiĭ v usloviâkh vechnoĭ merzloty v raĭone Anadyrâ; Text in Russian). Vestnik Dal'nevostochnogo Filiala Akademii Nauk SSSR, No. 12:81-91 incl. illus. tables, diagrs. 1935.
DLC, Q4.A28, No. 12

Construction on permafrost in the Anadyr region is discussed. The climate is characterized by an air temperatrue range of 24.2° to -46.2°C, a mean soil temperature of -7.9°C at 0.8 m., and a snow cover duration from Oct. 27-June 8 with a mean maximum depth of 55 cm. in April. Tests were conducted which indicate that the compressive strength of soils increases with decreased temperatures, and limited increase in moisture content. Increases in moisture content beyond 13.6% for clay soils and 19.23% for sandy soils reduce compressive strength. Ground deformation occurs not only when soil temperatures fluctuate between negative and positive temperatures, but also with temperature fluctuations below 0°C. Construction deformation may be prevented by surrounding the foundations with materials of low thermal conductivity, such as pumice or matrixes.

SIP U5571

Partanskiĭ, M. M.
CLIMATIC CONDITIONS OF THE RUSSIAN PART OF SAKHALIN. (Klimaticheskie usloviâ russkoĭ chasti o. Sakhalina; Text in Russian). Vladivostok, Dal'nevostochnyĭ Otdel Russkogo Geograficheskogo Obshchestva, 1929. 164p. incl. tables, 10 refs.
DLC, QC990.R92S34, 1929

The Russian part of the island is north of 50°N. lat. The climate of the eastern part of Sakhalin is affected by the cold Okhotsk Sea and the western part by the warm Kuro-Sivo current. Long-range data on the central part of the island are tabulated. The western part of Sakhalin has a mean air temperature of 0.4°-0.9°C, a winter season lasting 159 days, and a snow-cover duration of 170 days with an average depth of 48 cm. In the east, the mean temperature is -1.0° to -1.7°C with a minimum of -50.6°C, the winter season 188 days, and the snow cover duration 194 days with an average depth of 70 cm. Soil temperatures were measured at depths up to 3.6 m. The maximum frost penetration at Aleksandrovskoe (west) was 1.36 m.; at Tymovskoe (east) 0.58 m. These results are due to the heavier vegetative cover of the soil in the warmer area.

SIP U5572

Solov'ev, A. I.
CLIMATE. (Klimat; Text in Russian). p.71-79 incl. tables. (In: Kuril'skie Ostrova, by A. I. Solov'ev, Leningrad, Institut Geografii Akademii Nauk SSSR, 1947). 2 refs.
DLC, DS895.K9S65, 1947

The severe climatic conditions of the Kurile Islands are affected by low temperatures of the Okhotsk Sea and cold winds from the continent during the winter. Data obtained at Sian on Jetorofu Island indicate that the frost-free period occurs only in Aug. The average duration of the snow cover is 203 days, from Oct. 29 to May 19, and snow precipitation occurs from Nov. to June inclusive, an average of 144 days/yr.

SIP U5573

Basov, M. M.
CORRECTION FACTOR FOR THE FORMULA DETERMINING DISTANCE BETWEEN SNOW FENCE AND ROAD. (Popravochnyĭ koefitsient k formule opredeleniâ reastoâniâ snegozashchity ot osi dorogi; Text in Russian). Stroitel'stvo Dorog, 6, No. 8-9:20-21, 1943.
DLC, TE4.S73, v. 6

The distance of snow fences from the road is usually determined as a value equal to 12-18 times the height of the fence. Observations showed this rule to be incorrect since the deposition of snow is not only a function of height, but also of wind speed and type of snow fence. A formula is given in which the distance of snow fences from the road is determined as the product of the wind speed coefficient, a

relative value of the spacing, and the fence height. The coefficient of wind speed varied from 18 for strong winds to 10 for light winds, and the coefficient of resiliency in snow fences varied from 0.6 for snowbanks to 1.5 for brushwood fences.

SIP U5574

Abazaev, E.
WINTER OPERATING CONDITIONS OF A WATER TANK WITHOUT HEATING. (Ekspluatatsiia vodonapornoĭ bashni zimoĭ bez otopleniia; Text in Russian). Zhilishchno-Kommunal'noe Khozĭaĭstvo, 3, No. 2:22-24 incl. graphs, diagrs. 1953.
DLC, Slavic unclassified

A stone water tower was operated without heating since 1942 in a city of western Siberia where the winter air temperatures reach -45°C. An increased rate of water exchange in the tank prevented the water from freezing. The flow rate of the water circulating in the piping system was up to 0.7 m./sec. at outside temperatures to -30°C, and 1.4 m./sec. at temperatures below -30°C. Ice formations on the water surface of the tank which attained thicknesses of 20-30 cm. prevented considerable heat losses.

SIP U5575

Rost, Marceli
TECHNIQUE OF SNOW CONTROL ON RAILROAD TRACKS. (Technika walki ze śniegem na kolejach; Text in Polish). Przeglad Kolejowy, 4, No. 1:6-10 incl. diagrs. 1952.
DLC, Slavic unclassified

Various types of railroad snowplows used in Poland are described. A freight-car type snowplow is provided with a blade set at an angle and snow is removed from one or both sides of the railway tracks. It removes snowdrifts 40 cm. deep and moves with speeds up to 40 km./hr. Rotary plows revolving at speeds of 100-200 r.p.m. and traveling 5 cm. above the rails, move at speeds of 1-12 km./hr. Blower-type plows and electric or oil heating systems for melting the snow are described.

SIP U5576

TSapko, A. S.
REFRIGERATION AND PERMAFROST COLD STORAGE IN SIBERIA. (L'dosolevye i vechnomerzlotnye kholodil'niki v Sibiri; Text in Russian). Rybnoe Khozĭaĭstvo, 29, No. 2:12-14 incl. diagrs. 1953.
DLC, HD9465.R9B5, v. 29

Cold storages of 25 to 300-ton capacity are built in Siberia in permafrost 10-12 m. underground. The inside temperature is -2° to -3°C, the width of the galleries is 3 m. and the height is 1.8-2.2 m. The storage room is entered by a corridor at an 18° inclination from the side of a small hill. The effectiveness of the cold storage room is increased by spraying the walls with water once each yr. to form ice. The chambers are cooled directly in winter by ventilation using ventilating shafts.

SIP U5577

Winter, Heinrich
INVESTIGATIONS CONCERNING GLAZE FORMATION. (Untersuchungen über Glatteisbildung; Text in German). Meteorologische Z. 53:63-68 incl. tables, diagrs. Feb. 1936. 5 refs.
DLC, QC851.M3, v. 53

An analysis is made of 244 days on which glaze formation was observed in Vienna during the period from 1905-1935. Drizzling fog and ice storms at a temperature below or near the f.p. are 2 main causes of glaze formation. Drizzling fog is chiefly identified with anticyclonic and ice storms with cyclonic weather conditions. Drizzling fog predominantly occurs with southeasterly, and ice storms with southeasterly and southwesterly winds near the ground. The aerological condition of the atmosphere shows the presence of an inversion for both which is marked especially in the case of drizzling fog. Various conditions are determined which are favorable for the formation of glaze.

SIP U5578

von Kerner, Fritz
THE GROWTH LIMITS OF A SNOWFALL AT A DECREASING TEMPERATURE. (Über die Wachstumsgrenzen des Schneefalls bei sinkender Temperatur; Text in German). Meteorologische Z. 53:269-270 incl. tables, July 1936.
DLC, QC851.M3, v. 53

Relative temperature values are tabulated to indicate how the increasing duration of snowfall during decreasing temperatures counteracts the decreasing quantity of the snowfall. It is shown that the thermal conditions of snowfall increase during the decrease of the mean annual temperature until the mean summer temperature decreases to 0°C. The overcompensation of the decreasing snowfall quantity attains its limit sooner as a result of the increasing duration of the snowfall when the annual heat amplitude is increased.

SIP U5579

Friedel, Helmut
FUNDAMENTALS FOR A THEORY OF RECENT GLACIER FLUCTUATIONS. (Bausteine zu einer Theorie der rezenten Gletscherschwankungen; Text in German). Meteorologische Z. 53:375-384 incl. graphs, Oct. 1936. 15 refs.
DLC, QC851.M3, v. 53

Comparative totalizer and ombrometer measurements in Norway and the Alps indicate parallel precipitation and glacier fluctuations in Norway and opposite fluctuations in the Alps. It is assumed that precipitations at Alpine valley stations and glaciers

have inverse fluctuations and that the inversion increases with higher elevations. Precipitation and glacier fluctuation curves presented indicate a decrease in precipitation at elevations above 3000 m. explaining the recent Alpine glacier recession trend in spite of a secular precipitation increase in the region between the Alps and southern Scandinavia.

SIP U5580

Wagner, A.
ON THE EXPLANATION OF THE RECENT GLACIER VARIATIONS. (Zur Erklärung der rezenten Gletscherschwankungen; Text in German). Meteorologische Z. 54:147-150 incl. graph, April 1937. 6 refs.
DLC, QC851.M3, v. 54

The theory advanced by H. Friedel on the basis of totalizer measurements on the Sonnblick, assumes that a decrease of precipitation above certain altitudes causes general alpine glacier retreat. This theory is rejected on the basis of comparative measurements made with ombrometers and totalizers which indicate an increase in precipitation at altitudes from 592-3810 m. from 1911-1931. Additional precipitation measurements at high altitudes are required to establish a relationship between secular precipitation changes and glacier fluctuations. Limnographic recordings of glacier run-off, the intensity of ablation as a function of different meteorological factors, and the changes in the annual meltwater quantities were initiated to further research on recent glacier fluctuations. (See also SIP U5579)

SIP U5581

Kozlov, M. P.
HYDROMETEORS. (Gidrometeory; Text in Russian). Trudy Arkticheskogo Instituta (Leningrad), 73:88-89 incl. table, 1937.
DLC, G600.L4, v. 73

Data from 1926-1935 indicate a high frequency of glaze and rime at Yugor Shar. Glaze occurred annually on about 23.1 days with a high of 9.2 days in May. Rime formed on an average of 42.4 days/yr. with a maximum of 8.4 days in March. Rime was not observed during July and Aug. Hoarfrost usually occurred on about 20.4 days/yr. with a high of 4 days in Sept. The maximum thickness of glaze was 13 mm.; of rime, 50 mm.

SIP U5582

Nazarenko, B. P.
CONSTRUCTION OF AN AVALANCHE-DIVERTING TUNNEL. (Opyt stroitel'stva snegozashchitnykh galereĭ; Text in Russian). Stroitel'stvo Dorog, 8, No. 4-5:13 incl. diagrs. 1945.
DLC, TE4.S73, v. 8

Two 214-m. and 108-m. long tunnels were constructed on a section of a mountain pass road to prevent avalanche damages. The road located at an elevation of about 2000 m. in a narrow river canyon was usually blocked by snow up to 5 m. deep. The tunnel was designed for a snow cover 10 m. thick, and a tensile force of 3.2 kg./sq. cm. Concrete blocks were used for walls and reinforced concrete for the top.

SIP U5583

Shirkina, N. A.
SYNOPTIC CONDITIONS OF RIVER FREEZING IN THE EUROPEAN PART OF USSR. (Sinopticheskie usloviĭa zamerzaniĭa rek evropeĭskoĭ chasti SSSR; Text in Russian with English summary). Geofizicheskiĭ Sbornik, 7, No. 2:73-94 incl. table, maps, 1930. 3 refs.
DLC, QC801.L465, v.7

Data of autumn freezing of rivers for the period 1881-1910 and synoptic situations accompanying them are tabulated and mapped. The data are classified into 4 groups according to approximate date of early drift formation between Oct. 10-Nov. 11. The dependency of dates of river freezing on the intensity of the Azores high and the Iceland low pressures is established.

SIP U5584

Loveĭko, M. V.
SYNOPTIC CONDITIONS OF RIVER OPENING IN THE EUROPEAN PART OF USSR. (Sinopticheskie usloviĭa vskrytiĭa rek v evropeĭskoĭ chasti SSSR; Text in Russian with English summary). Geofizicheskiĭ Sbornik, 7, No. 2:95-117 incl. graphs, maps, 1930. 2 refs.
DLC, QC801.L465, v. 7

Synoptic processes accompanying the spring opening of rivers as well as weather situations of the preceeding seasons were investigated. Data of the period 1881-1910 are mapped and classified. The average date of river opening was March 18. A relationship between time of break-up and the duration of ice drifts was established. The shortest duration, about 16-20 days, was concomitant with the earliest opening dates. The normal duration was near 28-38 days, increasing up to 44 days for instances with the latest dates. The direction of anticyclonic trajectories and the intensity of circulation processes are important indicators for long-range forecasting.

SIP U5585

Ivanov, N. N.
REINFORCEMENT OF SMALL CONSTUCTIONS. (Usilenie malykh iskusstvennykh sooruzheniĭ; Text in Russian). Stroitel'stvo Dorog, 5, No. 6:6-9 incl. tables, graphs, 1942.
DLC, TE4.S73, v. 5

The strength of small and/or old bridges near Leningrad was increased during wartime by forming a 10 to 30-cm. ice cover over the bridging. Calculations indicate that a 20-cm. ice layer will increase

the load capacity of a bridge 3-4 times. The effectiveness of the measure decreases with increased distance between spans. Wooden bridges were covered with hay or moss before ice formation to compensate for the difference in the coefficients of linear expansion of wood and ice.

SIP U5586

Kaganov, M. A. and A. F. Chudnovskiĭ
CALCULATION OF THE SOIL THERMAL CONDUCTIVITY. (Ob opredelenii koeffitsienta temperaturoprovodnosti pochvy; Text in Russian). Izvestiâ Akademii Nauk SSSR, Seriâ Geofizicheskaâ; No. 2: 183-190 incl. tables, 1953. 10 refs.
DLC, QC801.A35, 1953

The various methods for calculating the thermal conductivity of soils are analyzed. Methods based on periodic temperature measurements are recommended. The determination of thermal maxima and minima and differences in phases at 2 depths are satisfactory methods when the soil is homogeneous such as exists at considerable depth. At least 4 observations at 6-hr. intervals at 2 depths are necessary to measure thermal conductivity of soil near the surface. The coefficient is calculated from equations of the law of amplitude attenuations. Widest variations of thermal properties of soils occur during freezing and thawing. Thermal conductivity measurements during these periods should be avoided.

SIP U5587

Warnick, C. C.
EXPERIMENTS WITH WINDSHIELDS FOR PRECIPITATION GAGES. Trans. Am. Geophysl. Union, 34:379-388 incl. illus. tables, graphs, diagrs. Discussion by Walter T. Wilson, p.388. June 1953. 2 refs.
DLC, QE500.A6, v. 34

The Eng. Exp. Sta. of the U. of Idaho conducted research with scale models in a low-speed wind tunnel and field tests at mountain locations to study the performance of existing precipitation gages and to improve the windshield designs. The specially designed wind tunnel is described in which sawdust served as artificial snow. Special photographic techniques were used to evaluate the performance of the various shields. The comparative catch of a number of differently shielded gages is tabulated. Two design modifications to the Alter shield are given. Laboratory studies indicated that an unshielded Sacramento gage caught about 27% of the theoretical true catch; the same gage equipped with a modified Alter-I shield caught 60%. Wind tunnel studies further indicated that the top of the baffle should be placed about 0.5 in. above the top of the gage orifice.

SIP U5588

Zhuravlev, L. I.
ACCUMULATION OF RIVER ICE FOR LOGGING. (Akkumulâtsiâ zimnego stoka rek dlâ lesosplava putem namorazhivaniâ; Text in Russian). Lesnaâ Promyshlennost', 11, No. 11:20-25 incl. diagrs. 1951.
DLC, SD1.L387, v. 11

River banks were flooded and the flood waters frozen in Buryato-Mongolia to prolong the period of high-water level needed for logging. As soon as the ice cover developed, ice dams were constructed in several sections by selecting transverse strips of ice, 1.5 m. wide, and removing all but a thin layer of ice to induce continued ice formation on the lower surface. This process was continued until the ice reached the bottom of the river. The dammed area flooded and the resulting ice accumulation prolonged the logging period for 1 month.

SIP U5589

Berlând, M. E.
TEMPERATURE VARIATIONS IN LAYERS NEAR THE GROUND AND FROST FORECASTING. (Izmenenie temperatury v prizemnom sloe atmosfery i predskazanie zamorozkov; Text in Russian). Izvestiâ Akademii Nauk SSSR, Seriâ Geofizicheskaâ, No. 2:166-182 incl. table, graphs, 1953. 10 refs.
DLC, QC801.A35, 1953

Variations of soil temperatures and air temperatures near the ground depend on heat transfer. This relationship is mathematically analyzed. Formulas for radiational frost forecasting were checked with empirical data. The forecasts of minimum night temperatures were accurate within 1°-1.5°C in about 350 cases. These formulas were modified by introducing the coefficients of thermal conductivity of snow and soil to determine temperatures under or over snow, and soil temperatures from air temperatures recorded at the standard level.

SIP U5590

Koloskov, P. I.
CLIMATIC OUTLINE OF THE KAMCHATKA PENINSULA. (Klimaticheskiĭ ocherk poluostrova Kamchatki; Text in Russian with English summary). Izvestiâ Dal'nevostochnogo Geofizicheskogo Instituta, 9, No. 11:119-145, tables, maps, diagrs. 1932. [Reprint]
DLC, QC990.S62K3, 1932

Data of 9 meteorological stations from 1908-1925 are tabulated and discussed. An atypical distribution of soil temperatures with depth was observed. A rapid increase of soil temperature with depth (2.5°C/3 m.) occurred in Klûchevskoe near active volcanoes. Soil temperature decreasing with depth (1.1°C/2.0 m.) was observed at Petropaviovsk due to cold sea water. A temperature difference of 11.5°C was observed at Petropaviovsk between the

snow surface (3 m. high) and the soil temperature at a depth of 0.25 m. This temperature difference was 5°-6°C at Klûchevskoe where the snow cover was scant. Maximum frost penetration was over 1 m. at Petropavlovsk, over 2 m. at Klûchevskoe, and less than 25 cm. at Tigril. Warm ground water prevented deep frost penetration at Tigril.

SIP U5591

Lutâkiĭ, S. L.
PERMAFROST IN SAKHALIN. (Vechnaîa merzlota na Sakhaline; Text in Russian). p.27-28 (In: Ostrov Sakhalin, by S. L. Lutâkiĭ, Moscow-Leningrad, Izdat. Glavsevmorputi, 1946)
DLC, DK771.S2L8, 1946

Permafrost in the Sakhalin peninsula has an irregular distribution. The depth of the active layer varies from 0.5-1.5 m. according to local conditions. The thinnest permafrost was found in the northern tundra region under moss. Permafrost was not observed along the southern coastline and valleys of large rivers. Permafrost caused a high moisture content in the upper layers of the soil and intensive spring flooding of rivers. The freezing processes in soil also cause the formation of icing mounds, and surface ice (naleds), when subterranean waters, under pressure by frost action, break the surface, spread and freeze.

SIP U5592

Lutâkiĭ, S. L.
CLIMATE. (Klimat; Text in Russian). p.28-32 incl. illus. (In: Ostrov Sakhalin by S. L. Lutâkiĭ, Moscow-Leningrad, Izdat. Glavsevmorputi, 1946)
DLC, DK771.S2L8, 1946

The cold Okhotsk Sea and the Sea of Japan effect climatic peculiarities in Sakhalin. Winter temperatures reach -50°C in the northern and eastern parts which border the Okhotsk Sea. The southern and central parts are characterized by a milder climate. Snow remains on the ground from late Sept. or early Oct. to May or June. The mean depth of the snow cover is 50-60 cm., but strong winds, especially in the cause snowdrifts and widespread transfer of snow.

SIP U5593

Ol'shanskiĭ, B. N.
MAINTENANCE OF WINTER ROADS. (Organizatsîâ zimnego soderzhaniâ frontovykh dorog; Text in Russian). Stroitel'stvo Dorog, 6, No. 10-11:14-15, 1943.
DLC, TE4.S73, v. 6

Snow removal from roads and prevention of snowdrifts are the chief maintenance measures planned by military road units. ZIS-5 trucks equipped with DAK snowplows are recommended for snow removal. Snow fences placed 30-35 m. from the road are installed according to prevailing wind direction. Snowbanks are necessary when the road is constructed in winter. An additional snowbank, 18-20 m. from the first, is desirable after the formation of a deep snow cover. A layer of straw placed on the roads before the spring thaw can prolong road trafficability.

SIP U5594

Stimson, Thomas E., Jr.
THE PRIVATE LIFE OF A SNOWFLAKE. Popular Mechanics, [97]:158-161, 242, 244 incl. illus. Feb. 1952.
DLC, T1.P77, v. 97

The Central Sierra Snow Laboratory near Donner Pass (Calif.), maintained by SIPRE, is located on a 4-sq. mi. enclosed mountain basin extending from 7000-9000 ft. elevation and having a single outlet. The laboratory is concerned with precipitation and run-off measurements and snow cover observations. The laboratories near Glacier National Park (Mont.) and Willamette Valley (Oreg.) collect meteorological data and develop run-off forecast formulas. The precipitation at the Sierra laboratory site averages 50 in./yr., snowfall 40 ft./season, and snow cover thickness 12-15 ft. The laboratory uses a network of remote control measurement instruments distributed over the valley area, to study the relationship between meteorological conditions and run-off. Snow depth at distant locations is recorded by means of a Geiger tube suspended over a capsule of radioactive Co and transmitted by short-wave to a receiver in the laboratory. Run-off of precipitation from a snow cover under different temperature conditions is studied by spraying measured amounts of water on a paved, walled-in snow area and measuring the run-off released by a single outlet. River basins with large snow accumulations absorb and retain large amounts of water which run off normally during the spring. Basins with thin snow covers may release all their snow accumulation together with the water from one warm rainfall.

SIP U5595

Koloskov, P. I.
CLIMATIC DESCRIPTION OF THE SOUTHERN SAKHALIN. (Klimaticheskoe opisanie îûzhnogo Sakhalina; Text in Russian). Gidrometeoizdat, Moscow-Leningrad, 1936, 36p. incl. tables, graphs.
DLC, QC990.S65S, 1936

The data of 6 meteorological stations from 10-22 yr. are tabulated and discussed. The climate of Sakhalin is subarctic with long and humid winters and cloudiness and fogs in the summer. Temperatures below freezing occur on approximately 191 days/yr., July and Aug. being the only frost-free months. Soils are frozen from Nov.-March in the north and northeast and from Dec. to spring in the south, and reach a maximum frost penetration of 0.4-0.5 m. Soils freeze to a depth of over 1 m. at Sikka in the northeast. The snow cover lasts an average of 200 days in the south to 220 days in the north. Average number of days with snow precipitation ranges from 90 days on the eastern coast to 120 days on the western coast.

SIP U5596

Neuhauss, R.
NEW PHOTOGRAPHS OF SNOW CRYSTALS. (Neue Aufnahmen von Schneekristallen; Text in German). Phot. Rundschau, [37]: 31-33 incl. illus. [1900]
DLC, TR1.P849, v. 37

Photomicrographs of snow crystals are difficult to produce due to the instability of the crystal form. A temperature of -5°C or lower is required and consequently, the photographs must be taken outdoors. A review of snow crystal photography from 1891-1899 is presented. Photographs were taken with orthochromatic Perutz plates at air temperatures of -10°C using a petroleum lamp as the light source, a focal distance of 30 mm., and a 10-sec. exposure. Exposure time was reduced 25% by using lim light. Heat rays were absorbed by a saturated solution of $Fe_2(SO_4)_3$. In one night snowflakes fell successively as hexagonal stars, plates, and prisms and were photographed. A continuation of this procedure is recommended to study changes in snow-crystal structure through photomicrographs

SIP U5597

Miethe, A.
SNOW AND ICE CRYSTALS. (Schnee- und Eiskristalle; Text in German). Prometheus, 4:357-361 incl. illus. 1893.
DLC, T3.T9, v. 4

Various snow crystal patterns were studied from photomicrographs. Unusual forms include needle-shaped snow crystals bearing identical snow plates or skeletons at both ends. Another unusual formation results from condensation of supercooled water droplets on snowflakes formed in higher, dry air layers. Observations of dendritic rime formations on window panes, ice crystal formation in supercooled water and ice crystals under polarized light are described.

SIP U5598

Wehner, Bruno
DISTRIBUTORS FOR SAND AND SALT. (Streugeräte für den Strassenwinterdienst; Text in German). Strasse u. Autobahn, 4:113-118 incl. illus. diagrs. April 1953.
DLC, TE3.S752, v. 4

Eighteen German and 50 foreign-made sanders of various designs are discussed. Sanders may be attached to vehicles and connected temporarily to the steering wheel, built into a vehicle and connected permanently to the steering wheel, separate trailers, or mounted on the chassis in place of the loading platform. Specifications for even spreading according to width and density, and independent of the speed of the truck are presented. Other general requirements include prevention of stone casting, spreading ahead of the truck wheels, uniform spreading of various materials, and simple servicing. Special requirements for built-in, mounted and trailer sanders are specified. Comparative tests of 6 built-in and 6 trailer sanders of German construction were conducted. Built-in sanders are recommended for simpler servicing and safer operation. Trailers are indispensable due to their adaptability. Spreading patterns and propulsions of different sanders are discussed and improvements in design and material recommended.

SIP U5599

Frøholm, G. A.
ROAD COVERS ON EARTH BANKS. (Vegdekke på jordfyllingar; Text in Norwegian [landsmål]). Medd. Vegdirekt. No. 3:46 incl. diagr. March 1950.
DLC, Unbound periodical

A roadbed of partly frozen clay was constructed in the winter of 1948-49 in Akershus (Norway). The moisture-retaining properties of the clay were counteracted by a cover of dense spruce needles. A 60-cm. layer of sand and medium gravel was placed over the spruce layer and raked to obtain a dense, smooth surface. The road was immediately opened to traffic. The road surface remained undamaged even during the spring thaw. Experiments using straw in place of spruce needles were reported successful. A mixture of straw and spruce needles has been proposed for trial.

SIP U5600

Petersen, G. and K. T. Bjørnslie
SNOW CUTTERS AND THE ALPINE ROADS. (Snöfresing og högfjellsvegene; Text in Norwegian). Medd. Vegdirekt. No. 3:42-43 incl. illus. March 1950.
DLC, Unbound periodical

Peter snow cutters were used to open a highway blocked with compressed snowdrifts as high as 3.5 m. Snowbanks not reached by the cutters were removed by a crew using Coldwell spades. A total of 19,704 cu.m. of snow was removed during May 24-30, 1949, or 10.66 cu.m./min. for 30 hr. 50 min. on 11.2 m. of road. A Peter snow cutter, a Diesel and a gasoline driven cutter were used to remove about 100,000 cu.m. snow on 29.5 sq. km. of road including snowdrifts as high as 4.5 m. A cost analysis of the operation is included.

SIP U5601

Deckart, M.
SNOW CRYSTALS. (Schneekristalle; Text in German). Natur u. Volk, 66, No. 1:1-7 incl. illus. Jan. 1, 1936.
DLC, QH5.S4, v. 66

Snow consists of hexagonal crystals. The 3 secondary axes lie in one plane and intersect at an angle of 60°; the main axis is perpendicular to the plane and is quite short. Occasionally the main axis is fully

developed, but the meteorological conditions under which this growth occurs are unknown. Snow needles, columns, skeletons, plates and intermediary forms are distinguished. Pure skeletons form in highly saturated air; plates develop gradually as condensation of new ice particles occurs in slightly saturated air and their density increases with decreasing moisture content of the air. Snow crystal develop on condensation nuclei formed by dust particles or ionized air particles. The crystal composition indicates moisture conditions during formation. Normal and atypical snow crystals are discussed.

SIP U5602

Wehner, Bruno
MEASURES FOR COMBATING GLAZE ON ROADS. (Massnahmen zur Glatteisbekämpfung auf Strassen; Text in German). Strassen- u. Tiefbau, 3:13-18 incl. illus. diagrs. Jan.-Feb. 1949.
DLC, Unbound periodical

The coefficient of friction of a blocked wheel on a dry ice-free road is .07-0.8 and on an iced road 0.2-0.05. Friction is lowest at temperatures near 0°C when a film of water acts as a lubricant between the tires and the road. Glaze forms on roads when the road temperature is below 0°C during fog and/or rain, when the road temperature is above 0°C during supercooled rain, and after thawing and refreezing of a snow cover. Details and recommendations on brakes are given. Glaze on roads is most effectively combated with abrasives. Several effective sanders, the storage of abrasives, and the use of chlorides with abrasives, are discussed.

SIP U5603

Jost, Wilhelm
GLACIER FLUCTUATIONS ON THE ISLAND OF DISCO IN WESTERN GREENLAND. (Gletscherschwankungen auf der Insel Disco in Westgrönland; Text in German). Z. Gletscherkunde, 27:20-28 incl. illus. map, April 1940.
DLC, QE575.Z4, v. 27

Data are presented which indicate that most glaciers on the island of Disco have retreated from 1913-1933 and that recession was greatest in glaciers with tongues terminating at low altitudes and small snow reservoirs. The disappearance of an ice shield at an elevation of 1200 m. shows that recession also occurred at higher altitudes. Glacier overthrusts occur in polar regions as exemplified by Sorte Huk overlapping a glacier to the east of it. The countless crevasses are attributed to the release of inner tension rather than rapid downward movement. (Author's abstract)

SIP U5604

Morawetz, Sieghard
THE RECENT GLACIER FLUCTUATIONS IN THE EASTERN ALPS. (Zur Frage der letzten Gletscherschwankungen in den Ostalpen; Text in German). Z. Gletscherkunde, 27:36-49 incl. graphs, tables, April 1940. 17 refs.
DLC, QE575.Z4, v. 27

Large and medium-sized glaciers retreated from 1-1.5 km. between 1850 and 1936. Glacier fluctuations are influenced primarily by climatic factors and secondarily by glacier form, surface and tongue size, and tongue inclination and location. The climatic factors initiate glacier changes and the secondary factors determine their extent. Values for solar radiation, temperature, precipitation, dry periods, and months of temperatures over 0°C measured on the Hohe Sonnenblick glacier are graphically presented and the influence of each element on the glacier economy is evaluated. Summer temperatures and precipitations were the most influential factors. Other factors in order of importance are heat accumulation during the summer months, duration of summer droughts, yearly precipitation, summer and annual radiation and annual temperatures. Alpine glaciers are classified into 3 groups according to surface area, size, and inclination of the tongue. Data on each group are cited in terms of growth and recession.

SIP U5605

Bobek, Hans
THE PRESENT AND ICE AGE GLACIATION IN THE HIGH MOUNTAINS OF CENTRAL KURDISTAN (EASTERN TAURUS, EASTERN ANATOLIA). (Die gegenwärtige und eiszeitliche Vergletscherung im Zentralkurdischen Hochgebirge [Osttaurus, Ostanatolien]; Text in German). Z. Gletscherkunde, 27: 50-87 incl. illus. table, maps, diagr. April 1940. 38 refs.
DLC, QE575.Z4, v. 27

Considerable glaciation was found in the 2 highest mountain ranges in Central Kurdistan. Approximately 20 glaciers exist, the largest of which are 2-2.5 km. long. The present snow limit was determined at 3500 m. rising to 4000 m. toward the north and northeast. Gavaruk was the largest glacier during the Ice Age and extended approximately 10 km. in length as observed by existing morainic debris. The snow limit during the Ice Age was about 2800 m. Soil formation such as stripes and small mounds are found in the area. It is assumed that the present glaciation is a remnant of ancient glaciation.

SIP U5606

Gt. Britain. Road Research Laboratory
SNOW CONTROL AND SNOW CLEARANCE. Library Communication No. 83/HHF. Dept. Sci. Ind. Res. 11p. Dec. 1946. 59 refs.
SIPRE files, S-750

An outline of the world position on snow control and clearance is presented. Methods of preventing snowdrifts by highway design and the use of snow fences are summarized. The duties of organizations responsible for snow-removal operations, the snow clearing and loading equipment are briefly described. Standard salt and sand treatment of icy roads and the more modern methods of removal by hosing and electric heating are reviewed. The work of the better known investigation, testing and research

organizations on snow control and clearance is mentioned. A bibliography consisting of 9 references by British authors and 50 from other countries is included.

SIP U5607

Reynolds, S. E.
THUNDERSTORM ELECTRICITY. Rept. No. 7, Res. and Development Div. N. Mex. Inst. Mining Tech. 34p. illus. tables, graphs, diagrs. March 5, 1953. 13 refs. (Contract No. DA-36-039-sc-5577)
ASTIA AD 8479

A study of the mechanics of electrical charge production and separation within thunderstorms is presented. Instrumentation, calibration, observation, and analysis techniques for locating thunderstorm charge centers are described. The instrument records show clearly the difference in the characteristic field changes produced by intracloud and cloud-to-ground discharges. The mechanisms of lightning discharges are discussed. Results of the analysis of the Sept. 5, 1952 storm are presented. The potential gradient records for cloud discharges at intermediate distances show a tendency to change from a positive slope to a negative slope as the cloud discharge progresses. This tendency suggests that higher and higher regions of positive charge and/or lower and lower regions of negative charge are neutralized during the course of a cloud discharge. The existence of 2 classes of negative charge centers, one at a much greater altitude than the other and the possibility of 2 active charge separation mechanisms are discussed. The study of electrical effects accompanying the growth of precipitation particles by riming or other freezing processes is advocated.

SIP U5608

Bunakov, E. V.
NATURAL CONDITIONS. (Prirodnaîa sreda; Text in Russian). Trudy Poliarnoĭ Komissii Akademii Nauk SSSR, 29:7-22 incl. illus. 1936. 17 refs.
DLC, G600.A 4, v. 29

The Nenets region is located between the Arctic Circle and the Barents and Kara seas. The region is characterized by a severe climate with a mean annual air temperature below 0°C. Permafrost was observed throughout the territory with the exception of a few places in the Pechora valley. The average depth of permafrost is 30-70 cm. for moss soil, 60-180 cm. for clay soil, and 80-250 for sandy soils.

SIP U5609

Roulet, M.
KEEPING THE VUE DES ALPES PASS OPEN DURING THE WINTER. (Die Offenhaltung der Vue des Alpes im Winter; Text in German). Strasse u. Verkehr, 39:141-144 incl. illus. May 8, 1953.
DLC, TE3.S755, v. 39

The pass rises from 1000-1300 m. elevation over 7 km. with a maximum grade of 11%, and descends from 1300-430 m. over 17 km., with a maximum grade of 10%. The 4 V-plows employed have a capacity of 120 hp. each. Adjustable side-wings lift the snow and deposit it behind the snow accumulations at the edge of the road. The V-plows are adequate for removing snow up to 1.20 m. deep. Snowdrifts are eliminated by pushing the snow with the V-plow to form a new snow wall on one side of the road, which is subsequently removed by rotary blowers mounted on jeeps. Snow removal procedures differ according to snowfall intensity and distribution, snow quality, road construction, wind direction, and solar radiation. Several generally applicable principles are outlined. The use of chlorides was discontinued due to rust formation on vehicles; coarse sand is spread on hard snow and fine sand on glaze.

SIP U5610

Knobel, A.
SNOW REMOVAL PROBLEMS IN THE CANTON OF URI. (Probleme der Schneeräumung im Kanton Uri; Text in German). Strasse u. Verkehr, 39:144-145, May 8, 1953.
DLC, TE3.S755, v. 39

Uri has a highway network 138 km. long, 43% of which is kept open for winter traffic. Snowplows are used to remove snow until snow accumulations make plowing impossible. Scarcity and high cost of manual labor necessitate the use of rotary blowers. Snow depths of 3-15 m. with a density of 600 gm./cu. dm. are removed from alpine roads at elevations from 1900-2400 m. Soot or coal dust are spread to facilitate melting in spring. Various snow removal equipment designs used in Switzerland are discussed, including blowers with horizontal and vertical drum axes with closed drums or screw-type blades on a horizontal corrugated shaft. The heavy-duty blower Peter removing a minimum of 500 cu. m./hr. of snow and the medium-weight Unimog blower are discussed in terms of efficiency.

SIP U5611

Molchanov, V. E. and V. Îa. Al'tberg
HYDROPHYSICAL PROCESSES. (Gidrofizicheskie protsessy; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 10:800-818 incl. tables, graphs, maps, 1936.
DLC, GB746.S75, v. 10

Ice conditions on the rivers of the North Caucasus vary widely according to terrain and climatic factors. Tabulated data on freeze-up and break-up from 1881-1932 indicate that the Don River freezes between Nov. 14-Jan. 12 and thaws from Jan. 24-April 6; the Kuban River freezes between Dec. 21-Feb. 10 and thaws from Jan. 7-April 1. The ice cover of the Don River reaches a maximum thickness of 78 cm.; the Kuban River, a maximum of 46 cm. Anchor and frazil ice, lasting 60-70 days during severe winters, affect hydroelectric installations, utilities,

and fisheries. Hot springs increase the temperature of mountain streams and prevent anchor ice formation.

SIP U5612

Sokolova, E. M.
CLIMATE OF THE NORTH CAUCASUS. (Klimat Severnogo Kavkaza; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 10:12-23 incl. tables, graphs, maps, 1936.
DLC, GB746.S75, v. 10

The climatic conditions of the North Caucasus vary from arctic in high mountains to subtropic near the Black Sea to desert in the northeast. Meteorological data from 1890-1930 are tabulated and mapped. Southern glaciers have retreated at a rate of 17.5 m./yr. from 1925-1930; northern glaciers at a rate of 6 m./yr. Glaciers maintained a state of equilibrium from 1912-1914. The highest depletion occurred during 1930-1932 when the mean annual temperature of the air was 1.1°C above normal.

SIP U5613

Samokhin, A. F. and P. D. Morozov
GLACIERS OF THE NORTH CAUCASUS. (Ledniki Severo-Kavkazskogo Kraia; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 10:557-578 incl. tables, 1936.
DLC, GB746.S75, v. 10

The glaciation area consisting of 1392 glaciers extends over 1468 sq. km. The metamorphic changes of the preceding 30-50 years are described. Glaciation is more extensive on the northern slopes of the Caucasus than on the southern slopes. The snow line reached 2650-2700 m. in the west and rose to 3700 m. in the east.

SIP U5614

Fetisov, V. A.
SNOW COVER. (Snegovoĭ pokrov; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 10:733, 748-758 incl. tables, maps, 1936.
DLC, GB746.S75, v. 10

Snow-cover data from 1885-1930 in the Caucasus are tabulated and mapped. The depth and duration of the snow cover depends largely on topography and distance from the sea. Deep snow accumulates in the mountains, 1.5-5 m. in the alpine zone west of Elbrus, markedly less in the steppes, and a scant 3 cm. in the desert. The snow cover lasts 200 days in the mountains decreasing to 20-30 days in the steppes and deserts. Snow often disappears during winter thaws near the seacoast. The density of snow prior to melting is 0.30-0.40 and increases to 0.70 during long melting periods.

SIP U5615

Krasovskii, A. A.
SNOW COVER. (Snegovoĭ pokrov; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 6:18-19, 304-307, 328-329 incl. tables, graphs, map, 1936.
DLC, GB746.S75, v. 6

The depth of the snow cover in the Don River Basin varied on an average from 45 cm. in the north to 10 cm. and less in the south. The water equivalent of snow was usually equal to 60-170 mm. (density near 0.32). A stable snow cover forms during Dec. and accumulates until March. A wide steppe area and strong winds favor intensive snowdrifts and snowstorms and cause considerable variations in snow-cover depth.

SIP U5616

Nikolaev, N. G. and A. Spengler
ICE REGIME OF THE WATER RESERVOIRS. (Ledovyĭ rezhim vodoemov; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 6:344-368 incl. tables, 1936.
DLC, GB746.S75, v. 6

Dates of river freeze-up and break-up from 1881-1929 are tabulated. The average freeze-up occurred in Nov. in the upper and middle parts of the Don River Basin, and Dec. 1-14 near the coast of the Asov Sea. The spring break-up was observed during March 12-April 12. Spring and autumn ice drifts on the Don lasted from 2-15 days. Lakes and ponds froze 5-10 days earlier than rivers and thawed 5-10 days later in the spring. The ice thickness on the Don in March reached an average of 25-50 cm. in the southern and northern regions and 50-75 cm. in the central area. The ice did not attain a thickness of more than 1 m. for the major part of the area. Intensive anchor and frazil ice formations are common. Anchor ice frequently appears in early Sept.

SIP U5617

Nikolaev, N. G. and N. T. Zikeev
SOIL FREEZING. (Promerzanie pochvy; Text in Russian). Spravochnik po vodnym resursam Gosudarstvennogo Gidrologicheskogo Instituta, Leningrad, 6:371, tables, 1936.
DLC, GB746.S75, v. 6

Mean and extreme values of frost penetration and duration of soil freezing are given for various observation periods from 1893-1925 for several stations in the Don River Basin. Severe frost and scant snow cover result in deep frost penetration. The maximum depth of soil freezing was 218 cm. at Nikolaevskoe, where the snow cover frequently blew away from the area of observation. Depths in the other parts exceeded 1 m. Soil remained frozen an average of 155-160 days at a depth of 10 cm., and 47-58 days at a depth of 1 m. The usual depth of frozen soil during Feb.-March exceeded 80 cm.

SIP U5618

Riesbol, Herbert S.
SNOW HYDROLOGY FOR MULTIPLE-PURPOSE RESERVOIRS. Proc. Am. Soc. Civil Engrs. 79, Separate No. 189:19p. incl. tables, graphs, May 1953. 13 refs.
DLC, Unbound periodical

The processes of snow melting and run-off are briefly described. Examples are given for procedures to be followed in applying knowledge of these processes to determine space allocations and spillway capacities. The practical determination of a maximum probable snow flood is based on empirical relationships derived from studies of observed run-off, precipitation, temperatures, and wind velocities with values adjusted for reasonable concurrence of maximum conditions.

SIP U5619

Bydin, F. I.
PRECIPITATION. (Osadki; Text in Russian). Issledovanie rek SSSR, Gosudarstvennyĭ Gidrologicheskiĭ Institut, 5:66-72 incl. tables, graphs, 1933.
DLC, TC1.L342, v. 5

The effects of solid and liquid precipitation on the water regime of rivers were analyzed and the water equivalent of the snow cover was calculated. This method is based on the relationship of snow depth to the sum of winter air temperatures above 0°C. Graphs indicate the interrelationship between the depth of the snow cover, snow density, and positive air temperatures.

SIP U5620

Sharp, Robert P.
SUITABILITY OF ICE FOR AIRCRAFT LANDINGS. Trans. Am. Geophysl. Union, 28:111-119 incl. tables, graphs, diagrs. Feb. 1947. 24 refs.
DLC, QE500.A6, v. 28

Information pertinent to some aspects of aircraft operations on ice, particularly landings, was compiled from various sources. Formulas from which the thickness of ice required for aircraft landings on skis can be calculated are presented for river, lake, and old sea ice. Young sea ice must be 3 times as thick as river ice. Planes on wheels require about 20% greater thickness than planes on skis. The strength of ice increases 4 times with a temperature drop from 23° to -76°F. Foreign materials and snow cover weaken the ice. Freeze-up occurs from several days to several weeks after the mean air temperature falls below freezing, then the rate of formation and growth of ice is predictable from a curve of degree days of frost. Salinity retards freezing; currents, waves, and snow cover retard the growth of ice but wind may be an asset. In spring ice strength decreases more rapidly than thickness. The rough surface on sea ice limits its use more than thickness or strength. Ice airdromes can be operated all year in high arctic latitudes but heavily used runways on ice must be rested frequently to permit sealing of cracks and recovery from fatigue.

SIP U5621

Domanevskiĭ, N. A.
CONDENSATION OF WATER VAPOR. PRECIPITATION. (Kondensatsiia vodianogo para. Atmosfernye osadki; Text in Russian) p.24-34 incl. tables, map, diagrs. (In: Gidrologiia i Gidrometriia, by N. A. Domanevskiĭ, Moscow, Izdatel'stvo Ministerstva Rechnogo Flota, 1951). 17 refs.
DLC, GB661.D65, 1951

Conditions producing clouds, fog, glaze, rime, hoarfrost, and other hydrometeors are analyzed. The distribution of precipitation over the USSR is indicated on a map and discussed. The instruments used for measuring precipitation, depth and density of the snow cover are described. Approximately 30-35% of the precipitation in the north and 15% in the south is solid, mostly in the form of snow. The normal depth of the snow cover in most parts of the USSR is over 50 cm. It is between 30-100 cm. in western Siberia and about 20 cm. in Transbaikal and the Amur region.

SIP U5622

Kalesnik, S. V.
NATURE OF THE ANTARCTIC. (Priroda Antarktiki; Text in Russian). Izvestiia Vsesoiuznogo Geograficheskogo Obshchestva, 81:557-568, 1949. 2 refs.
DLC, G22.R6, v. 81

Antarctica has a mean elevation of approximately 2200 m. above sea level. The relief and geological peculiarities lead to the assumption that the elevation resulted from the accumulation of about 1600 m. of ice. Mean summer temperatures throughout Antarctica are below the f.p. and drop to -20°C and lower in the central parts of the continent. The highest temperature was +6°C at the Graham Islands. The winter temperatures of Antarctica are between -18° to -36°C with extremes of -62°C. Strong winds characterize Antarctica. Adelie Land is subjected to wind speeds of 22-40 m./sec. and as high as 90 m./sec. Annual precipitation amounts to approximately 200-400 mm. and increases to 600-800 mm. in some areas. Rain is unusual and occurs only in the part lying in the Western Hemisphere.

SIP U5623

Davydova, M. A.
TEMPERATURE OF THE AIR. (Temperatura vozdukha; Text in Russian). Trudy Arkticheskogo Instituta (Leningrad), 73:41-75, 112-129 incl. tables, graph, 1937. 2 refs.
DLC, G600.L4, v. 73

Temperature data of Vaigach and Yugor Shar from 1914-1935 are tabulated and discussed. The winter lasts about 8 months with extreme minimum air

temperatures of -44.1°C at Yugor Shar and -42.5°C at Vaigach. Ice floes begin to appear in the Yugor Strait between Oct. 19-Dec. 12, and a solid cover forms between Nov. 16-March 1. Spring break-up occurs between June 3-July 11 in the Strait and the ice disappears between July 16-Sept. 10. The Strait is navigable for 80-110 days.

SIP U5624

Kozlov, M. P.
SNOW COVER. (Snegovoĭ pokrov; Text in Russian). Trudy Arkticheskogo Instituta (Leningrad), 73:81-83, 136-139 incl. tables, 1937.
DLC, G600.L4, v. 73

Data on depth, density and duration of the snow cover at Vaigach and Yugor Shar from 1925-1928 are tabulated. The average duration of the snow cover was 242 days at Vaigach, and 248 days at Yugor Shar. A mean maximum depth of about 30 cm. occurred in March. The usual density of the snow cover from Jan.-May was 0.33. Strong arctic wind produced many large snowdrifts.

SIP U5625

Dîagilev, V. F.
PRECIPITATION. (Osadki; Text in Russian). p.55-59 incl. tables, graph. (In: Pribaĭkal'e, by V. F. Dîagilev, Sibkraĭizdat, 1929). 79 refs.
DLC, GB311.D5, 1929

The annual precipitation in the major part of Baikal region is less than 400 mm. except in a few places in the southwest. The snow cover generally lasts from mid-Oct. to late April and attains a depth of 21-37 cm. in Feb. A deep snow cover developed only in the mountains. A maximum snow cover of about 130 cm. is usual at Mishikha (814 m. elevation).

SIP U5626

Dîagilev, V. F.
RIVERS. (Reki; Text in Russian). p.66-76 incl. illus. (In: Pribaĭkal'e, by V. F. Dîagilev, Sibkraĭizdat, 1929). 5 refs.
DLC, GB311.D5, 1929

The water level of the Angara River is high at the time of the autumn freeze-up. Anchor ice formation from the riverbed upwards takes place in the winter. The normal freeze-up date of the Angara near Irkutsk is Jan. 12 and the spring break-up is April 9. The ice cover attains a thickness of 94-106 cm. The river is navigable 240-313 days near Irkutsk, 222-287 days near Usol'e, and 173-266 days near Bratsky Ostrog. Many tributaries of the Angara freeze solid during severe Siberian winters.

SIP U5627

Dîagilev, V. F.
PERMAFROST IN SOIL. (Vechnaía merzlota pochvy; Text in Russian). p.62-65.(In: Pribaikal'e, by V. F. Dîagilev, Sibkraĭizdat, 1929). 12 refs.
DLC, GB311.D5, 1929

The major part of the Baikal region is located in an area where the permafrost has an average thickness of 12.42 m. and the active layer is at a mean depth of 6.37 m. The active layer on northern slopes of river valleys and under moss-covered soil occurs at depths of 0.3-0.94 m. Thick permafrost was found under swamps. Drainage and the removal of moss and forest shrubbery could lead to permafrost degradation in this area.

SIP U5628

Snyder, Franklin F.
LARGE FLOODS FROM MELTING SNOW AND RAIN. p.179-196 incl. tables, graphs, [1951]. (In: Union geodésique géophys. intern. assoc. hydrologie sci. assemblée générale de Bruxelles. 1951, v. 4). 17 refs.
DWB, M(06) I311g S. Hyd. 1951, v. 4

The general considerations which determine the relative magnitude of snow and rain floods as compared to floods from rain alone and the relative significance of the contribution from snow melt are discussed. Situations in which the snow melt contributes to large floods occur when a short-period accumulation of snow is followed by rainfall of large magnitude for the season, or when a large seasonal snow accumulation melts under a critical temperature sequence with the occurrence of appreciable rainfall at the time of maximum snow melt run-off. The effects of the physical characteristics of the drainage basin on snow melt and of the snow cover on rainfall and snow melt are discussed. Snow melting processes and computational techniques for small areas based on a heat balance approach are described. Two methods of computation of basin wide snow melt from an area-elevation curve and the temperature lapse-rates for various possible conditions are presented. The computation of extreme flood conditions to determine the design of spillways and major dams is discussed and examples of recent floods are analyzed.

SIP U5629

Rîazantseva, Z. A.
GEOGRAPHICAL DESCRIPTION OF THE REGION. (Geograficheskoe opisanie raĭona; Text in Russian). Trudy Arkticheskogo Instituta (Leningrad), 102:5-6, maps, 1937. 3 refs.
DLC, G600.L4, v. 102

The new Siberian Islands and the estuary of the Lena River were investigated by expeditions and permanent stations. The new Siberian Islands are located in southeastern part of the Laptev Sea. The upper layers of the Laptev Sea have a low salt content and

a relatively high temperature due to fresh water from the Lena River. Autumn freeze-up between the Islands and the continent occurs around Nov. 22. The best time for navigation is between Aug. 15-Oct. 1. The Lena River near Bulun (200 km. from the estuary) is covered by ice from Oct. 20 to June 2. Floating ice is usually observed north of the Islands. A layer of fast ice in the Laptev and eastern Siberian Seas extends 250-270 mi. from the coast.

SIP U5630

Rŝazanŝeva, Z. A.
SNOW COVER AND SNOWSTORMS. (Snegovoĭ pokrov i meteli; Text in Russian). Trudy Arkticheskogo Instituta (Leningrad), 102:41-42, 44-47 incl. tables, 1937.
DLC, G600.L4, v. 102

Meteorological data from 1896-1935 in the new Siberian Islands and the estuary of the Lena River are tabulated. The average duration of the snow cover was 8.5-9 months (Sept.-June) but snow may occur in summer for brief periods. Strong winds and frequent snowstorms (up to 136 days/yr.) cause an irregular distribution of the snow cover and highly compressed snowdrifts. Granular snow attains a density of 0.30-0.34 before melting.

SIP U5631

Rŝazanŝeva, Z. A.
CLOUDINESS, FOGS, AND HYDROMETEORS. (Oblachnost', tumany i gidrometeory; Text in Russian). Trudy Arkticheskogo Instituta (Leningrad), 102:47-51 incl. tables, 1937. 1 ref.
DLC, G600.L4, v. 102

Regions located near large open sea areas, such as Lyakhovsky Island, are subjected to intensive formation of hydrometeors. Meteorological data of Lyakhovsky Island are compared with those of Tiksa Bay. Glaze occurs on Lyakhovsky Island an average of rime on 153 days, and ice needles on 43 days/yr. At Tikso Bay glaze occurs on 2 days, rime on 52 days, and ice needles on 5 days/yr.

SIP U5632

Rengmark, Folke
DEPENDENCE OF SPRING THAW DAMAGES ON WEATHER CONDITIONS. (Om tjälskadornas beroende av väderleksförhållanden; Text in Swedish). Svenska Vägförening. Tid. 39:208-213 incl. illus. graphs, March 1952.
DLC, Unbound periodical

Graphical presentations of temperature and precipitation for 1950-1952 support the assumed correlation between the softening of the road cover on the Vänersborg roads and weather conditions. The freezing and thawing seasons of 1950-1951 were characterized by heavy precipitation and frequent fluctuation of freezing and thawing, whereas the 1951-1952 seasons had less precipitation and a short, mild winter. Less ground water to produce frost action effects would be present if more adequate construction procedures had been used.

SIP U5633

Jacobsen, N. Kingo
ARCTIC PROBLEMS IN RELATION TO NAVIGATION. (Arktiske problemstillinger i relation til besejlingen; Text in Danish). Geografisk Tids. 51:94-133 incl. maps, 1951. 42 refs.
DLC, G25.D19, v. 51

Arctic transportation problems are discussed. The routes of various arctic expeditions are reviewed and plotted on maps showing the ice conditions. Meteorological factors affecting the formation of different types of ice are discussed in relation to the life cycles of coast ice, pack ice, and floebergs. F. Nansen's 2 laws on the movement of ice are: (1) the ice mass moves at a rate 20% of that of the wind, and (2) the drift deviates to the right of the prevailing wind by 30°-40°. Two new laws were added by Subov after the Sedov's drift: (1) The direction of the movement is parallel to the isobars and (2) the speed is proportional to the gradient. The references include the Soviet-Russian research, particularly on the Northeast Passage because of its military significance.

SIP U5634

THE PULKS (SLEDS) OF THE SOVIET-RUSSIAN INFANTRY. (Det sovjetryska infanteriets pulkor; Text in Swedish). Pansar, Teknik, Underhåll, 14, No. 3:15-18 incl. illus. 1945.
DLC, U4.P34, v. 14

The 3 types of pulks (sleds) used by Soviet-Russian ski troops are described. Type 1 has a flat bottom and carries a light machine gun and 3 boxes of munition. Spare parts, tools, and equipment are kept in 2 rooms provided with doors, one on each side of the shaft of the gun. The doors, swung open, support the elbows of the gunner in action. The sled, pulled by 2 men, accommodates 6-8 munition boxes or 5 boxes of mortar shells when used for transport only. Types 2 and 3 are boat-shaped, and are pulled by 3 and 2 men respectively. Type no. 2 carries either a mitrailleuse and 4 munition boxes, 8 munition boxes or 1 wounded man. Type no. 3 carries either the mortar or 5 boxes of mortar shells. In the 3 types the cargo is secured during transportation by buckled leather straps sidewise and lengthwise. The towlines of leather or rope are fastened one on each side or one in the middle at the front end of the sleds.

SIP U5635

Korch, S.
GERMAN MILITARY VEHICLES. (Tyska militärfordon; Text in Swedish). Pansar, Teknik, Underhåll, 21, No. 1-2:21-23, 28 incl. illus. 1952.
DLC, U4.P34, v. 21

The front and steering system of the German-built (35-hp.) vehicle Ketten-Kraftrad, resemble those of a motorcycle. The tractor-like rear has caterpillar belts with 19-cm. wide plates with rubber treads interchangeable with 38-cm. wide plates for better traction on snow fields. The vehicle can be equipped with ice spikes, special snow chains fastened to every other plate, and an ice breaking mechanism to eliminate accumulations of ice on the inner side of the belts when driving in loose snow. The vehicle crosses 45-cm. deep water and was successfully used under all conditions and terrain during military operations in USSR during World War II. The vehicle weighs 1560 kg. fully equipped, has a maximum speed of 70 km./hr. and carries 3 men, trailer and cargo. Detailed specifications are given.

SIP U5636

Bauer, Hans
NEGOTIATING CURVES IN WINTER. (Kurvkörıng vintertid; Text in Swedish). Pansar, Teknik, Underhåll, 21, No. 1-2:23-24 incl. graph, 1952.
DLC, U4.P34, v. 21

A value of 0.7 was obtained for the coefficient of friction in summer on a dry pavement. The coefficient decreased to 0.3 during rain. The maximum non-skidding speed of a car on a 100-m. radius curve was 94 km./hr. under dry summer conditions. This value was reduced to 50 km./hr. on dry ice in winter (coefficient, 0.2) and to 25 km./hr. on wet ice (coefficient, 0.5). The relation between the maximum speed and the curve radius for various friction coefficients is presented graphically.

SIP U5637

Karavaeva, T. A.
POLAR WATER SLEDS. (Polîarnye vodîanye sani; Text in Russian). Sovetskaîa Arktika, 3, No. 2:107-108, 1937.
DLC, G600.S6, v. 3

The polar water sled described consists of a combined ice- and aero-sled, equipped with a 100-hp. airplane motor and propeller. A boat-like chassis with a wide stern was equipped with small skis. A firm keel of iron-clad oak serves as lead runner on ice or snow. The sled is 6.5 m. long, 2 m. wide, and weighs 870 kg. It is made of beach wood with textolite paneling and has a speed of 40 km./hr. over water and 70 km./hr. over ice or snow. The sled carries 5 people and supplies.

SIP U5638

Lappo, V. I.
PETROLEUM OCCURRENCE IN NORDVIK (ÎURUNG-TUMUS). (Neftîanoe mestorozhdenie Nordvik [ÎUrung-Tumus]). Nedra Arktiki, 1:74-129 incl. tables, graphs, map, diagrs. 1946. 2 refs.
DLC, TN85.N44, v. 1

The first USSR oil deposits in permafrost were found in Nordvik where the permafrost is 540 m. deep. The soil temperature at depths of 56-60 m. is -12.7°C and increases gradually both up and down. The average annual air temperature is -15°C and the snow cover is scant. Other oil deposits in permafrost regions are possible.

SIP U5639

Arkhipov, P. P. and N. V. Krylov
SNOW LOAD ON A ROOF. (Snegovaîa nagruzka na krovli; Text in Russian). p. 65-66 incl. map, diagrs. (In: Spravochnik po Sel'skokhozîaĭstvennomu Stroitel'stvu, Vol. I, Moscow, Sel'khoziz, 1950)
DLC, TH4916.S6, 1950

The snow load on a roof is calculated by multiplying the weight of the snow cover in kg./sq. m. by a coefficient depending on the roof slope. The USSR is divided into 5 regions with mean weights of snow cover varying from less than 50-200 kg./sq. m. as determined from 10 yr. of observation. The snow load on roofs with an inclination greater than 50° is practically 0. The coefficient is considered equal to 1 with inclinations of 0°-25° and is calculated by interpolation for angles from 25°-50°.

SIP U5640

Rutkovskiĭ, V. I.
FOREST INFLUENCE OF SEASONAL DISTRIBUTION OF RUN-OFF. (Vliîanie lesov na raspredelenie smoka po sezonam; Text in Russian). Trudy Vtorogo Geograficheskogo S"ezda, 2:397-404 incl. tables, graphs, 1948.
DLC, G56.V8, v. 2

Snow-cover observations in European USSR at about 2000 places showed the effect of forests on the rate of snow melting. Measurements indicated that snow melted at the rate of 16 mm./day in a field, 5 mm./day in a spruce forest, 8 mm./day under pine trees, and a maximum of 10 mm./day under greenwoods. The forest reduced frost penetration into soil and modified the moisture regime.

SIP U5641

Ogura, Yoshimitsu
A SUPPLEMENTARY NOTE ON THE PROBLEM OF ICE FORMATION. J. Meteorological Soc. Japan, 30:231-239 incl. table, graphs, July 1952. 5 refs.
DLC, Div. Orientalia

The formula expressing the speed of the growth of an ice layer, assuming identical temperatures for the ice surface and the air, is refined taking into consideration the heat transfer from the ice surface into the air. Values computed by this new formula are in fairly good agreement with the experimental data obtained by K. Neumann. The relationship between the heat transfer coefficient and the wind velocity is discussed. The theory of heat transfer from the ice surface into the air is based on the existence of a turbulent boundary layer near the surface. (See also SIP U2668)

SIP U5642

Norway. Norske Himalaia-Ekspedisjon
ATOP THE SUMMIT OF THE TIRICH MIR. (Tirich Mir til topps; Text in Norwegian). Oslo, Gyldendal, 1950. 175p. incl. illus. maps.
DLC, DS485.H6N6, 1950

The activities of the Norwegian Himalaya Expedition in 1949 are described. Ablation at Barum Glacier measured 8 cm./day, and 7 m. in one summer. Ablation is balanced at about 7000 m. above which snowfall is in excess of melting. A small black stone placed on the glacier surface sank 18 mm. into the ice in 1 hr. and 50 mm. in a day. The melting of surface snow was studied. This type of snow was found at elevations of 4000-5000 m. on sloping terrain. The snow field appeared as rows of curves, towers and spires. Snow crystal studies at an elevation of 3200-4500 m. were made by the rubbing method. The crystals were 1-300 mm. long. Test results of various pieces of the expedition's equipment are given.

SIP U5643

Kinch, K.
WINTER ROAD CONFERENCE IN FINLAND. (Intervägdagar i Finland; Text in Swedish). Svenska Vägförening. Tid. 40:111-112 incl. illus. April 1953.
DLC, Unbound periodical

Winter maintenance of railroads, streets and narrow roads, sanding problems and radio network were discussed at the meeting of the Nordic Road-Technical Association in Finland during Feb. 1953. A patented method to maintain ice-free water channels was demonstrated. Compressed air was used to force the warmer bottom layers of water to the surface. Hoses (0.75 in. in diam.) were equipped with 4-8 nozzles separated 3.5 m. from each other and placed at any desired depth with weights. The operation required 2 or 3 men to push the hoses below the ice with sticks. The opening up of a 170-m. channel with an ice cover 60-70 cm. thick required 43 compressor hours and 75 man hours. (See also SIP U3264)

SIP U5644

Eriksson, Sigurd and Gunnar Petterson
EROSION IN REGULATED WATER COURSES AND RELATED PROBLEMS. (Erosion i reglerade vattendrag och därmed sammanhängande problem; Text in Swedish). Grundförbättring, 5:118-133 incl. illus. 1952.
DLC, Unbound periodical

The extent and nature of shore and bottom erosion, particularly as affected by ice in Swedish inland waters, are discussed. Accumulations of broken ice cover produce shore erosion by pressure. Bottom erosion may occur when an ice cover breaks, accumulates under the newly formed ice, and repeated changes in the water level occur. The salmon fishing and lumbering industries contribute to this type of damage. The up and down movement of ice as a result of changes in the water level mechanically wears down embankments. Swedish damages as compared with those of foreign countries are insignificant. Nevertheless, preventive measures, such as reinforcing embankments with stones, are maintained. Tests were started with plants in the spring of 1952.

SIP U5645

Hognestad, Per
GLACIAL INVESTIGATIONS IN JOTUNHEIMEN. THE CAMBRIDGE JOTUNHEIMEN EXPEDITION 1951. (Breundersøkelser i Jotunheimen; Text in Norwegian). Naturen, 77, No. 1:2-11 incl. illus. graphs, maps, 1953.
DLC, Q4.N15, v. 77

Two tunnels were dug by hand into the Skautho Glacier, located in Jotunheimen between 1605-1800-m. elevation. The upper tunnel, about 100 m. above the main tunnel, was 24 m. in length when it terminated in a large cave separated from the mountainside by about 2 m. The temperature was 0.10°C at the entrance, and -0.2°C at the end of the tunnel. The lower tunnel was 5-6 ft. high, 2 ft. wide and 121 m. long and equipped with a laboratory of about 10 sq. m. at the far end for the study of ice crystals. Temperatures during July-Aug. ranged from -0.2° to -0.6°C near the surface and a constant 0°C in other locations. The ice mass close to the mountainside moved forward and downward, and the ice near the entrance moved forward and upward. The rotary movement in the lower ice mass was 1 cm./day confirming Lewis' theory on a vertical rotary movement. Surface movements were photographically recorded. The snow line in Jotunheimen is near an elevation of 2050 m. The slow ablation is assumed to be due to the lower snow line on a snow surface, and to the shielding effect of the surrounding mountains.

SIP U5646

Carlsson, Orvar
THE RESISTANCE OF CERAMIC MATERIALS AGAINST FROST. (Teglets frostbeständighet; Text in Swedish). Grundförbättring, 5:197-210 incl. diagrs. 1952. 3 refs.
DLC, Unbound periodical

Frost resistance tests of tile pipes were made at Chalmers Technological University. Red and yellow clays of various consistency were kilned at different temperatures to obtain test material of varying porosity and consistency. No conclusive results were obtained but some correlation between frost resistance and pore size is suggested. This correlation may be explained by the relation between the diameter required to resist the pressure of water as a function of time and/or that water freezes at different temperatures depending upon the diameter of the pores. The freezing temperature decreases as the pore diameter decreases in size. The expansion on freezing of small pores between larger ones will collapse the walls of the larger pores and/or expand the tiles.

SIP U5647

Rykke, Knut
SNOWBANK CUTTER (Kantfreser; Text in Norwegian). Medd. Vegdirektøren, No. 3:45-46 incl. illus. diagrs. March 1951.
DLC, Unbound periodical

A specially designed snow cutter for reducing snowbanks along roadways is illustrated and described. The machine consists basically of the right hand section of a twin rotary snow cutter of German design (Hohlschleuder) mounted on a towed sled. Snowbanks up to 1.5 m. high and 1 m. deep were removed at a rate of 600-900 cu. m./hr.

SIP U5648

Baldwin, Henry I.
THE FALL OF BROWN SNOW IN NEW HAMPSHIRE. Science, 83:371, April 17, 1936.
DLC, Q1.S35, v. 83

Severe dust storms occurred in Colo. on Feb. 24, 1936. Ten cm. of light snow fell at Hillsboro (N. H.) that evening, followed by 2 in. of sleet and hail on the following morning. The snow was pure white, but the hail deposit was brownish purple. Sample areas of 1 sq. m. were laid out on level ground at 3 places about 100 m. apart at an elevation of 800 ft. The discolored snow and hail were removed from the sample areas, put in kettles and allowed to melt. A purple oily film formed on the surface and sediments settled out. The dry weight of the sediment from the 3 sample areas shows that the hail and sleet contained 12.3 lb./acre or almost 4 tons/sq. mi. of dust.

SIP U5649

Transehe, N. A.
THE ICE COVER OF THE ARCTIC SEA, WITH A GENETIC CLASSIFICATION OF SEA ICE. p.91-123 incl. illus. map, diagrs. (In: Problems of Polar Research. Spec. Pub. No. 7. Am. Geographical Soc. 1928). 35 refs.
DLC, G576.A6, 1928

The ice cover of the Arctic Sea consists of pack ice, fast ice, and the Arctic Pack during 10 months of the year; pack ice and the Arctic Pack during the remaining 2 months. The Arctic Pack occupies about 70% of the Arctic Sea area. Fast ice and pack ice occupy concentric belts around the Arctic Pack covering respectively 5% and 25% of the Arctic Sea in winter. Fast ice is horizontally immobile young ice attached to the shore; pack ice is sea ice that has drifted from its original position. The Arctic Pack is old ice constantly drifting in a more or less definite direction. The life cycle of the ice cover is caused by processes of heating and changes of water temperature occurring during 2-3 months of the year. Fast ice disappears in summer passing into the pack ice which feeds the Arctic Pack. Sea ice is classified genetically into accretional types and dynamic types. Various types of sea ice are defined. Additional descriptive terms expressing state, condition of surface, age, strength, arrangement, and characteristic phenomena other than the genetic classification are given. The regional aspects of the polynyas and leads is discussed.

SIP U5650

Kolchak, A.
THE ARCTIC PACK AND THE POLYNYA. p.125-141. (In: Problems of Polar Research Special Pub. No. 7. Am. Geographical Soc. 1928)
DLC, G576.A6, 1928

The characteristics of the Arctic Pack are its power, its increasing solidity and size. The constant slow motion of the Arctic Pack causes local shock and pressure of the ice as well as polynyas, channels and cracks. The motion of the Arctic Pack along the Asiatic continent is west by north and west-northwest, winds being responsible for its general western direction. Off Grant Land and further to the west the Pack has a southerly tendency. The formation of polynyas is closely related to the position of the coast in relation to the movements of the Arctic Pack. It is favored along the Siberian coast between 180° and 130°E. long. where the motion of the pack is from the coast to the northwest. Shock and pressure ice are produced along the American Arctic archipelago and the coast of Alaska where the southernly motion of the Pack crowds its ice masses against the shores of the Beaufort Sea.

SIP U5651

Lukachev, K. I.
CONSTRUCTIONS IN PERMA-FROST REGION--PARTS I AND II, 1938. ATI No. 36929, Central Air Documents Office. 167p. incl. illus. tables, graphs, maps, diagrs. April 1949. 142 refs. (Translation)
AMAU, M-35669-NC

See SIP U1144

SIP U5652

Nakaya, Ukichirō and Jūji Sugaya
A REPORT ON PERMAFROST SURVEYING (MANCHURIA, 1943). Transl. by E. R. Hope, Defence Sci. Information Service, (Canada), 11p. tables, graphs, diagrs. Jan. 24, 1953.
ASTIA AD7676

The distribution of ground temperatures in permafrost in early autumn when the active layer has melted to a maximum depth was studied to evaluate the hardness of the upper layer of the permafrost and to estimate the solidity of foundations. Thermocouples were inserted into holes bored through the permafrost to 3 m. below the frozen surface. The temperature is close to 0°C in the upper part of the frozen layer, -0.3°C at 1 m. below the frost line, and remains above -0.4°C to a depth of several m. Temperature measurements at the ground surface and at depths of 10 and 20 cm. gave a value of 0.005

c.g.s. units for the coefficient of thermal diffusion in the active layer in the thawed state. The character of the soil in the thaw layer and in the frost layer was examined. The fine particles wash out of the active layer when it thaws. Permafrost forms by cooling from above. A frost-heaving ratio of 8% was calculated for a sample obtained at 2.68 m. below the surface, or 0.58 m. in the frost layer.

SIP U5653

Devaux, Joseph
A STUDY OF THE ALBEDO OF SNOW IN THE INFRARED SPECTRUM. (Étude de l'albedo de la neige dans le spectre infra-rouge; Text in French). Compt. Rend. 200:80-81, Jan. 2, 1935. 1 ref.
DLC, Q46.A14, v. 200

The albedo of snow and glaciers was measured in the laboratories of the Pic du Midi Observatory, by comparing the solar radiation spectrum diffused by the snow with that of a known quartz diffuser exposed to the same light. The spectograph and thermal vacuum pile receptor used are described. The diffusion factor for a melting snow cover with large grains in mid-day varies from 0.67-0.01 for wave lengths of 0.6-1.5 μ. The curve expressing the diffusion factor as a function of the wave length shows a minimum at 1.0 μ and another at 1.2 μ.

SIP U5654

Bydin, F. I.
THE PREVENTION OF ICE-DRIFT DAMAGES ON THE SVIR RIVER. (Bor'ba s ledokhodom na r. Svir'; Text in Russian with English summary). Leningrad, Svir'stroĭ, 1933. 15Cp. incl. illus. tables, diagrs. 3 refs.
DLC, GB1308.S8S8, 1933

Freezing and opening data of the Svir River, collected from 1929-1932, are tabulated and discussed. The interrelations between the thermal state of the soil, air temperatures, snow cover and the icing processes in the river are analyzed. The tabulated data and suggested equations show that the water cooling was most intensive at the beginning of autumn when the ground was snow-free, and was about 3.5 times less near the date of freeze-up. The formation of anchor ice was found to depend largely on the physico-chemical properties of the soil, but independent of river flow speed. Preventive measures against ice drift and anchor ice damages are described.

SIP U5655

Rusinova, I. L.
BRIEF METEOROLOGICAL CHARACTERISTICS OF THE SERGEI KAMENEV ISLANDS. (Kratkaîa meteorologicheskaîa kharaketeristika ostrovov Sergeîa Kameneva; Text in Russian with English summary). Trudy Arkticheskogo Instituta (Leningrad), 55:22-83 incl. tables, graphs, 1936.
DLC, G600.I4, v. 55

Meteorological data of the Sergei Kamenev Islands from Oct. 1, 1930-Aug. 30, 1934 are tabulated. The mean annual temperature of the 4-yr. period was -14.0°C, or 40° lower than on Franz Joseph Land. The extremes varied from 6.2° to -46.9°C. Frost-free days were never observed. Snowfall was noted an average of 78 days/yr. and the snow cover persisted from Sept. 19-25 to June 27-July 6. Glaze was observed 4 times/yr.; rime, 33 times in 2 yr.

SIP U5656

Spengler, O. A. and A. M. Rubin
OPENING AND FREEZING. (Vskrytie i zamerzanie; Text in Russian). Spravochnik po vodnym resursam, 17:312-321 incl. tables, graphs, 1936.
DLC, GB746.S75, v. 17

Long period observations (11-73 yr.) of river freezing made on large rivers of Yakutia are tabulated. The normal freeze-up date for the area occurred during Oct. and at a slightly earlier date in the northern part. Ice drifts precede the autumn freeze-up by 3-12 days. Spring ice drifts last an average of 7-11 days. The spring break-up begins in mid-May in the south and about mid-June in northeast Yakutia. The mean duration of ice varies from 200 days in the south to 250 days near the estuaries of the Yana and Indigirka rivers.

SIP U5657

Nikolaev, N. G. and A. M. Rubin
THE ICE COVER AND THE FORMATION OF ANCHOR ICE. (Ledovyĭ pokrov i obrazovaniîa donnogo l'da; Text in Russian). Spravochnik po vodnym resursam, 17:322-334 incl. tables, map, graphs, 1936.
DLC, GB746.S75, v. 17

Heavy frosts, thin snow cover, and permafrost contribute to the extensive ice formation on rivers in Yakutia. Rivers as large as the Yana, Zeya, and Indigirka are often frozen solidly at many places. Extensive formation of river naleds occurs over the ice cover of frozen river sections. A naled, 26 km. long, 6-7 km. wide and up to 4 m. thick, was observed in the winter of 1927-28 on the Kegelli River (Indigirka basin). Naleds up to 18 sq. km. are common. Excessive anchor ice produces naleds by blocking the narrow parts of the river. A mean ice thickness of 70-100 cm. occurs in the south, 235 cm. and over north of Yakutia. The ice on the Lena River near Bulun was 280 cm. thick during the winter of 1901-1902. Tabulated data on the Vilyi River indicate that ice thickness depends on air temperature, depth of snow cover, and intensity of anchor ice formation.

SIP U5658

Spengler, O. A.
PERMAFROST. (Vechnaîa merzlota; Text in Russian). Spravochnik po vodnym resursam, 17:345-360 incl. illus. tables, map, diagrs. 1936.
DLC, GB746.S75, v. 17

Yakutia is mainly in a region of extensive permafrost. Thawed areas in the frozen soil were observed south of the 10°C annual isotherm in the middle and upper sections of the Aldan River Basin. The thickness of the active layer depends on soil composition and geographical location and varies from 0.2-0.4 m. in peat soil to 1.2-1.6 m. in sandy soil in the north. Annual temperature variations in soil south of 55°N. lat. were observed to a depth of 0.8-1 m. in peat soil and 3-4 m. in sandy soil. Permafrost was found at a depth of 2 m. in the Yakutsk region. The lower boundary was not reached at a depth of 150 m. Permafrost is more than 59 m. thick in the lower section of the Lena River basin.

SIP U5659

Zaĭkov, B. D.
SNOW COVER. (Snegovoĭ pokrov; Text in Russian). Spravochnik po vodnym resursam, 17:287-291 incl. tables, graphs, 1936.
DLC, GB746.S75, v. 17

Data from 8-11 stations in the Lena-Indigirsk region for varying periods beginning with 1892 are summarized. The snow cover appears on the average from mid-Sept. in the northern part to early Oct. in the Vilni-Yakutsk valley. Snow melting occurs in reverse order from the first of May to the first of June. The mean number of days with snow cover varies from 215-264. The minimum mean snow depth (14-27 cm.) occurred in the basin of the Yana River, and the maximum mean snow cover (56-84 cm.) in the upper part of Aldan basin. The continental climate of the region causes rapid snow melting in the spring.

SIP U5660

Kirin, V. V.
EXPERIMENTAL INTRODUCTION OF HYDROMECHANIZATION AT THE KUIBYSHEV STATION UNDER WINTER CONDITIONS. (Opyt vnedreniia gidromekhanizatsii v zimnikh usloviiakh na Kuĭbyshevgidrostroe; Text in Russian). Mekhanizatsiia Trudoemkikh i Tiazhelykh Rabot, 6, No. 5:5-11 incl. illus. tables, diagrs. 1952.
DLC, T58.A2M45, v. 6

Special instructions are given for each winter operation according to prepared graphs. Working the ground in situ, supporting the unfrozen space around the dredging machines, preparing and operating the hydromechanical equipment and ice-cutting machines are illustrated and described. Ice thicker than 1 m. is broken by blasting with 2-kg. charges. Preliminary heating of pits, syphons and pumps, preparing of supply lines (80-90 cm. in diam.) with 1.5-2° inclination, and using communication facilities are emphasized. Pipes carrying pulp were laid on wooden ties directly on ice or above the ice on wooden supports.

SIP U5661

Arctic Indoctrination School
HANDBOOK FOR WINTER TRAINING. 38p. incl. appendices I-II, [n.d.]
AMAU, M-34373-14-NC

Special training and equipment are needed to enable troops to operate successfully in extreme cold. Instructions are given on: the care of snowshoes after wearing and during storage and shoeing techniques which promote foot comfort and snowshoe efficiency; the use, care, and loading of convertible sled-toboggans; factors determining the method of emergency shelter construction, and a description of 12 types of shelters; recommended winter camouflage methods from air and ground and deceptive measures; tactical notes on attack, defense, and withdrawal; care and maintenance of clothing and equipment, personal hygiene and precautions in cold, first aid and evacuation, cooking and preparation of food, bivouac and marches, notes on packboard and woodcraft, and general advice to promote personal comfort. Advice on skiing and the fundamentals of driving Weasels are appended.

SIP U5662

Gerasimenko, V. I.
ELECTRIC DISCHARGES BY SNOWSTORMS. (Elektricheskie razriady vo vremia snezhnykh bur'; Text in Russian). Problemy Arktiki, No. 10:43-51 incl. tables, graphs, diagrs. 1940. 4 refs.
DLC, G600.P7, 1940

Observations of the electric potential with Benndorf's electrograph and of electric discharges by a special installation were made at Calm Bay (Franz Joseph Land) during Nov. 1938-May 1939. The maximum discharge current was observed during snowstorms and minimum air temperatures. Small particles of snow in the air also increased the intensity of the discharges. The discharges from the electrical point usually began with an electric potential of 700-800 v./m. The maximum discharge current (13.83 μa) was observed with a potential of 1390 v./m. Discharges were noted on 38% of the days.

SIP U5663

Ōkita, T.
ELECTRON-MICROSCOPIC STUDY OF ICE-CRYSTAL NUCLEI IN THE ATMOSPHERE. (Denshi kenbikyō ni yoru tennen no hyōshō-kaku no kenkyū; Text in Japanese with English summary). J. Meteorological Soc. Japan, 30:379-385 incl. illus. tables, Dec. 1952. 8 refs.
DLC, Div. Orientalia

Ice-crystal nuclei collected on Mt. Zaō (Japan) were observed under an electron-microscope and submitted to an HF test. Most of the nuclei were soil particles such as hematite and limonite; very few combustion nuclei were found. Upper-air soundings indicated that these ice crystals were formed at a temperature of about -9°C. (See also SIP U4913)

SIP U5664

Kumai, Motoi and Keiji Higuchi
MEASUREMENT OF THE MASS AND NUMBER OF FALLING SNOW CRYSTALS IN THE ATMOSPHERE. (Kōsetsu-jt ni taiki-chū ni fukumarete iru yuki no kesshō no kazu to shitsuryō no sokutei; Text in Japanese with English summary). J. Meteorological Soc. Japan, 30:345-355 incl. illus. tables, graphs, maps, Nov. 1952. 13 refs.
DLC, Div. Orientalia

Air temperature and crystal formation of falling snow varied remarkedly during the 12-hr. snowfall of March 2, 1951 which produced a 17-cm. snow cover with a 13-mm. water equivalent. Small sheets of black paper and clear glass slides momentarily immersed in a 1-3% solution of formvar in ethylene dichloride were exposed horizontally for 30 sec. to falling snow crystals. The total mass and the number of snow crystals in the atmosphere were calculated from the 34 most interesting specimens collected. The order of magnitude of the total mass was 0.1 gm./cu. m. coinciding with the liquid water content in cumulus clouds. The order of magnitude of the number of snow crystals was 10^4 particles/cu. m.

SIP U5665

Al'tberg, V. Ia. and others
INVESTIGATIONS OF THE WINTER REGIME OF THE VOLKHOV RIVER DURING 1929-31 IN THE REGION OF 6TH HYDROELECTRIC STATION. (Materialy po issledovaniiu zimnego rezhima reki Volkhova v 1929-1931 g.g. v raĭone 6-ĭ GES; Text in Russian). Issledovanie rek SSSR, Gosudarstvennyĭ Gidrologicheskiĭ Institut, 2:3-60 incl. illus. tables, graphs, diagrs. 1932.
DLC, TC1.L342, v. 2

The thermal regime of the Volkhov River, especially crystallization and ice formation processes, was studied to determine methods for eliminating the clogging of turbine racks by anchor ice. Tables and graphs of temperature distribution in the water indicate a relationship between climatic conditions and ice formation. Supercooling of the river water was usually more intensive at night. Low air temperatures, ice-free water surfaces, and strong winds are factors favorable for anchor ice formation. The construction of a water reservoir in front of the dam decreased the amount of anchor ice formed. Crystallization occurs when water is supercooled to -0.032°C. A relationship was established between the degree of supercooling and the amount of ice-free river surface.

SIP U5666

Bydin, F. I.
GROWTH OF ICE. (Rost l'da; Text in Russian). Issledovanie rek SSSR, Gosudarstvennyĭ Gidrologicheskiĭ Institut, 5:105-109 incl. illus. graphs, 1933.
DLC, TC1.L342, v. 5

The temperatures of air and water, the depth and density of snow cover, and the flow speed are important factors in ice growth. N. P. Poryvkin's formulas for calculating ice thickness from snow depth and flow speed result in values deviating widely from observed values. Data of the Svir River were used to modify the formulas for ice thickness by introducing the factor of air temperature.

SIP U5667

Bydin, F. I.
FREEZING AND OPENING. (Zamerzanie i vskrytie vod; Text in Russian). Issledovanie rek SSSR, Gosudarstvennyĭ Gidrologicheskiĭ Institut, 5:163-190 incl. tables, 1933. 3 refs.
DLC, TC1.L342, v. 5

Data on river-ice formation from 906 places along the Baltic Sea for periods ranging from 10-100 yr. are used to establish a statistical relationship of freeze-up and break-up dates with the period when air temperatures are below 0°C. Rivers froze about 16-27 days after air temperatures began to be below 0°C. Rivers opened 7-19 days after air temperatures rose above the f.p. Rivers in the USSR remained ice covered an average of 190 days in the basin of the White Sea and 105 days in the basin of the Black Sea.

SIP U5668

Bydin, F. I.
THE PECULIARITIES OF WINTER REGIME OF THE VOLGA RIVER. (Kharakternye cherty zimnego rezhima r. Volgi; Text in Russian). Issledovanie rek SSSR, Gosudarstvennyĭ Gidrologicheskiĭ Institut, 6:45-72 incl. tables, graphs, diagrs. 1933. 18 refs.
DLC, TC1.L342, v. 6

The records of 1877-1930 indicate that the Volga River freezes first near Nizhni Novgorod, then in the upper and middle sections, and finally in the area between Stalingrad and Astrakhan. Ice melting in spring occurs in reverse order. The Volga is ice-covered in the upper and middle sections from late Nov. to mid.-April, and in the lower section from early Dec. to mid-April. These dates are subject to wide variation. The estimated thickness of Volga river ice ranges from 0.75-1.30 m.

SIP U5669

Berg, E. V. and G. A. Platunov
WATER LEVELS OF THE NEVA RIVER IN PRESENCE OF ICE JAMS. (Urovni vody reki Nevy pri ledianykh zazhorakh; Text in Russian). Issledovanie rek SSSR, Gosudarstvennyĭ Gidrologicheskiĭ Institut, 9:24-108 incl. tables, graphs, diagrs. 1936. 24 refs.
DLC, TC1.L342, v. 9

Data on frequency, duration, and distribution of ice jams are tabulated. Observations made in Lenin-

grad for 50 years showed that ice jams occurred in the Neva River 46 times during autumn and 36 times during spring. Ice jams blocked the river channel and raised the water level in autumn as much as 1.35 m. and in spring above winter norms.

SIP U5670

Wagner, Julius
THE ALPINE GLACIER. (Der alpine Gletscher; Text in German). Geographische Rundschau, 5:29-34 incl. illus. tables, diagrs. Jan. 1953.
DLC, G1.G367, v. 5

An area of 3500 sq. km. of the Alps is covered by glaciers. The areas, lengths, tongue lengths and elevations of the glacier terminals are tabulated for the largest alpine glaciers. The climatic snow limit in the Alps ranges from 2400-3200 m. Snow precipitation amounts to 65% of the total precipitation above 2400 m. and to 10% at 500 m. elevation. The structure and flow velocity of a glacier are discussed. Differential velocities in a glacier form crevasses. The origins of marginal, horizontal, and longitudinal crevasses are discussed. The fluctuation periods of the Alpine glaciers are reviewed.

SIP U5671

Polĭakov, B. V.
TOTAL EVAPORATION. (Summarnoe isparenie; Text in Russian). p. 126-145 incl. tables, graphs, map, diagr. (In: Gidrologicheskiĭ Analiz i Raschety, by B. V. Polĭakov, Leningrad, Meteoizdat, 1946)
DLC, GB746.P65, 1946

Total evaporation values from vegetation, soil, snow or ice surface in European USSR are mapped and winter evaporation values from the snow, ice and meltwater surfaces are tabulated. The relationships between evaporation and temperature are indicated. Evaporation from the snow surface amounted to 30, 22, 12, and 3 mm./month at 0°, -3°, -7° and -20°C and daily evaporation averaged from 1.78 and 1.42 mm. in Nov. and March to 0.25-0.38 mm. in Jan.-Feb. respectively.

SIP U5672

Robitzsch, M.
SNOW CRYSTALS. (Schneekristalle; Text in German). Naturforscher, 11:300-306 incl. illus. Dec. 1934.
DI, 410N219, v. 11

The formation and growth processes of snow crystals, based on A. Wegener's theory and experiments, are traced. The crystallization process taking place on a falling crystal is determined by a multiple exchange of the nourishing materials at the points exposed to ventilation, in addition to diffusive actions. The condition of the air layers traversed by the falling snow crystal is reflected in the crystal form, distorted by the influence of the continuously changing speed of fall. The conditions favoring the formation of the various crystal forms are discussed.

SIP U5673

Wegmann, C. E.
ICE AND SNOW FORMS IN NORTH-EAST GREENLAND. (Eis-und Schneeformen in Nordostgrönland; Text in German). Naturforscher, 11: 414-419 incl. illus. March 1935.
DI, 410N219, v. 11

The ice and snow forms of Christian X Land are classified into single-year and multiple-year forms. Single-year forms include fjord ice, the snow of the depressions, and river ice; the multiple-year forms include sea ice, firn, and glacier ice. The properties, extent, and duration of each are discussed. The snow in the depressions was found to be of very low density, 1 cm. snow corresponding to 0.31-0.35 mm. water at temperatures between -9° to -12°C.

SIP U5674

Bykov, V. D.
THICKNESS OF ICE, OF SNOW ON ICE, AND OF FRAZIL ICE. (Tolshchina l'da, snega na l'du i shugi; Text in Russian). p.109-114 incl. diagrs. (In: Gidrometriĭa, by V. D. Bykov, Leningrad, Gidrometeoizdat, 1949)
DLC, TC177.B9, 1949

The thickness of the ice, snow cover on the ice, and the frazil ice are measured every 3 days at all hydrological stations. Measurements are made in the middle of the stream and 5-10 m. from the bank. Instruments used include a sharp pointed steel bar 40 cm. long, weighing 2.5 kg. and equipped with a wooden handle and leather loop to prevent slipping, an ice drill or boring bit of 10-cm. diam. with a handle, and an ice drill consisting of a spiral steel bit of 4-cm. diam., a rod and a brace for rotating the drill. A hole may be drilled in 3-5 min. through ice 80 cm. thick with the latter set.

SIP U5675

Chekotillo, A. M.
DEFORMATION OF ICE STOREROOMS. (O deformatsii ledĭanykh skladov; Text in Russian). Priroda, 42, No. 4:94-97 incl. illus. diagrs. 1953.
DLC, Q4.P8, v. 42

An isothermal storeroom for the conservation of fruits and vegetables was built in Moscow during 1939-40. The roof of the ice storeroom is hemispherically shaped to avoid plastic deformation of the ice. The thickness of the ice for walls and roof is about 2 m. A 1-m. layer of sawdust was placed around the ice for thermoinsulation. The thermal effects of precipitation and underground water initiated thawing of the ice foundation and the settling of the construction for an average of 3.5 cm./month. Maximum settling was observed during

July-Oct. The storeroom was repaired 4 times during 12 yr. Each time a 1.5-m. layer of ice was sheared inside and a new one frozen on from the outside.

SIP U5676

Altberg, W. J.
ON THE CAUSE OF THE FORMATION OF ICE AT THE BOTTOM OF RIVERS AND LAKES.
Quart. J. Roy. Meteorological Soc. 49:54-59 incl. table, graphs, Jan. 1923. 1 ref.
DLC, QC851.R8, v. 49

The bed of the Neva River (USSR) at a depth of 20 m. was covered with a continuous sheet of loose ice 0.76 m. thick in Dec. 1914. All objects resting on it were similarly covered and the 2 m. wide apertures of the receiving pipes were covered with ice 0.6 m. thick. Laboratory work was started to determine the importance of each of the factors involved in the process of the water cooling and its transformation into ice. Water may be supercooled by gradual cooling in a state of complete quiet, or by rapid cooling accompanied by continuous stirring. The essential condition for the transition of water into the supercooled state lies in preventing the water from coming in contact with the solid phase. Crystallization can only be maintained if there is a continuous removal of the heat evolved in the process of crystallization. The mechanical intermixture of the layers caused by a maximal loss of heat maintains an energetic exchange of heat between the bottom and the surface. A continuous supercooling is present and an uninterrupted process of crystallization occurs. Extensive accumulation and adhesion of fine particles of ice found in the water favors the further growth of the primary layer of ice on the bottom of the river.

SIP U5677

Liders, G. V.
SNOW CONTROL. (Snegobor'ba; Text in Russian). p.297-310 incl. illus. diagrs. (In: Zheleznodorozhnyĭ Put', by G. V. Liders, Moscow, Transzheldorizdat, 1950)
DLC, TF240.L49, 1950

Snowdrift liabilities on railroad lines in the USSR are classified into 3 categories depending on the height of the railway cuts. Cuts 0.4-8.5 m. high are most liable to snowdrifting; cuts over 8.5 m. high are not subjected to snowdrifts. Single and double track plows, ram snowplows, Nosorog', rotary, and blower type snowplows are described. The ram type snowplow raises the snow slightly before pushing it to the sides and is used for snowdrifts over 1.5 m. high. The operation of a rotary snowplow is explained schematically. Snow fence utilization is illustrated. Movable fences, 2x1.5 m. or 2 x 2 m., made of wooden boards nailed to wooden poles, are described. When snowdrifts reach two-thirds of the snow fence height, the fences are moved to the tops of the snowdrifts. Evergreen trees are planted in 2 rows 10-15 m. apart at least 30 m. from the roadline. Deciduous trees provide snow protection when planted in single rows 30-80 m. wide and 20-25 m. from the line. Other types of snow fences are described. Railway plows of the Gavrichenko type which transfer the removed snow into freight cars and snow-melting pits in railroad yards are briefly described.

SIP U5678

Sapozhnikova, S. A.
HEAT BALANCE OF THE ACTIVE SOIL SURFACE IN THE PRINCIPAL GEOGRAPHICAL ZONES OF USSR. (Teplovoĭ balans deĭatel'noĭ poverkhnosti v osnovnykh geograficheskikh zonakh SSSR; Text in Russian). Trudy Vtorogo Geograficheskogo S"ezda, 2:228-239 incl. tables, 1948. 20 refs.
DLC, G56.V8, v. 2

Data on solar and outgoing radiation and albedo are tabulated for 8 zones of the USSR from 80° 20'N. lat. (Tiksi Bay) to 41° 20'N. lat. (Tashkent). The values of heat exchange in soil were calculated with reference to soil moisture, evaporation and turbulent exchange of heat between the soil and the air. The monthly mean albedo at Tiksi Bay and Calm Bay was 86% during a winter with a stable snow cover. The albedo diminished to 80% in May with the beginning of snow melting.

SIP U5679

Maksimovich, G. A.
PRINCIPLES IN THE STUDY OF HYDROCHEMICAL FACIES. (Osnovy ucheniĭa o gidrokhimicheskikh fat͡siĭakh; Text in Russian). Gidrochimicheskie Materialy, 18:75-85 incl. tables, graphs, 1950. 33 refs.
DLC, QD169.W3G5, v. 18

The basic laws governing the distribution of natural waters of varying composition are discussed. The distribution is associated with the 5 principal types of geodynamic zonality: planetary, geotectonic, structural, climatic, and geomorphologic. Graphic data are presented on the prevalence and composition of rivers, lakes, ground waters, and different types of ice in relation to the soil solution of different zonal soil types. Three modes of ice formation are distinguished: the atmogenic ice of snow, hail, glaciers, and cave ice which forms by sublimation processes; anchor ice and ground ice formed by the direct transformation of water into a solid; and lake and river ice where the surface is formed from atmogenic snow, and the lower portion from frozen water.

SIP U5680

Luzanski, N.
HOW WEGENER MEASURED THE ICECAP IN GREENLAND. (Hvordan Wegener målte innlandsisen på Grønland; Text in Norwegian). Teknisk Ukeblad, 79:388-389 incl. diagr. 1932.
DLC, T4.T3, v. 79

Seismological means of measuring the thickness of inland ice are described. Explosions are set off, causing vibrations which penetrate the ice at a certain velocity. The direct and reflected waves are recorded on a seismograph. The depth of the icecap may be calculated from the time between observations of the direct and reflected waves, and the distance from the explosion location to the seismograph.

SIP U5681

Kuhn, W.
FIRN INCREASE FOR 1948-1949 IN SOME SWISS FIRN AREAS. (Der Firnzuwachs pro 1948/49 in einigen schweizerischen Firngebieten; Text in German). Viertel. jahrsschr. naturforsch. Ges. Zürich, 94:252-256 incl. tables, Dec. 31, 1949. 3 refs.
DLC, Q67.Z94, v. 94

A very dry and warm summer followed a snow-poor winter. The total precipitation was less than that of 1946-1947, but the ablation was smaller than in 1947 due to lower summer temperatures.

SIP U5682

Kuhn, W.
FIRN INCREASE FOR 1947-1948 IN SOME SWISS FIRN AREAS. (Der Firnzuwachs pro 1947/48 in einigen schweizerischen Firngebieten; Text in German). Vierteljahrsschr. naturforsch. Ges. Zürich, 93:271-275 incl. tables, Dec. 31, 1948.
DLC, Q67.Z94, v. 93

An above-average accumulation of snow was observed as a result of large Nov. precipitation amounts. The relatively high temperatures and the influence of the wind prevented abnormal accumulations. The large increase in firn is ascribed to low ablation in the course of the wet summer.

SIP U5683

Kuhn, W.
FIRN INCREASE FOR 1946-1947 IN SOME SWISS FIRN AREAS. (Der Firnzuwachs pro 1946/47 in einigen schweizerischen Firngebieten; Text in German). Vierteljahrsschr. naturforsch. Ges. Zürich, 92:269-273 incl. illus. tables, Dec. 31, 1947.
DLC, Q67.Z94, v. 92

The winter was marked by a relatively early snow cover and scant accumulation until the end of Feb. March precipitation effected moderate increases in the snow cover. Ablation started in April and produced the largest loss of firn hitherto measured as a result of the extremely hot and dry summer.

SIP U5684

Haefeli, R.
ON THE ACTIVITY OF THE WEISSFLUHJOCH STATION OF THE SWISS COMMISSION FOR SNOW- AND AVALANCHE-RESEARCH. (Ueber die Tätigkeit der Station Weissfluhjoch der Schweiz. Kommission für Schnee- and Lawinenforschung; Text in German). Schweiz. Bauztg. 113, No. 25: 2p. incl. illus. graph, diagr. June 24, 1939. (Reprint)
SIPRE files

The application of scientific research results to avalanche forecasting, artificial avalanche release and avalanche defense construction are discussed. Avalanche prognoses are based on observations of the snow cover undergoing metamorphism. Avalanche release by mortar and hand grenades requires careful timing and aiming and is closely related to avalanche research. A snow pressure apparatus consisting of a 6-sq. m. surface of wood members, calibrated springs, and a recorder is described. Individual unit defense constructions are recommended for high-altitude snow covers of great tensile strength. A typical unit group of defense elements is described.

SIP U5685

Bureau of Yards and Docks
OVER-ICE FREIGHTING REPORT 1947. 82p. incl. illus. tables, map, Oct. [23] 1947.
AMAU, M-34115-NC

Over-ice freighting for the Naval Petroleum Reserve No. 4 was started on Feb. 13 when the ice was 48 in. thick and was discontinued on May 3 when deemed too dangerous. The most severe weather conditions occurred on Jan. 19 with a minimum temperature of -65°F and a wind speed of 40 m.p.h. The performance of the B-8 tractors, winterized and provided with hard wood block replacements and rollers, and of the Michler No. 9 extra heavy duty modified sled was excellent. Detailed statistics covering the trips, make-up of trains, loads, fuel consumption, and operating hours are given. Two Balderwin snowplows used to clear the snow ahead of the trains were particularly valuable in deep snow. Trail scouting and trail staking was made easier by flying the approximate route by plane and dropping weighted stakes for the scout Weasel to follow. It is hoped that instruments for rapidly determining ice thickness and depth of water beneath will be perfected and available for next year's staking operations.

SIP U5686

Folk, S. H.
SUMMARIES OF OPERATIONAL AND SCIENTIFIC REPORTS. N.C.B.D. 1058, Bureau of Yards and Docks, 34p. incl. tables, Jan. 1946.
AMAU, M-34117-NC

The reports cover operations at the Naval Petroleum Reserve No. 4 during 1944-45. Only minor defects

were noted in the performance of D-8 caterpillar tractors, M29C Weasels, several bob-sleds and 4 all-wood wanigans. All lubricants and fuels were satisfactory in continued sub-zero temperatures. Standard issues of navy clothing did not provide adequate protection; army issues of arctic clothing were satisfactory; native garments or their equivalent were the only ones adequate during continued exposure. Sled-freighting experiences are described. Many bore holes were abandoned because rapid freeze-up endangered the drill-rods. The zone from 12-160 ft. seemed to freeze up most rapidly. Permafrost extends at least to 580 ft., and the minimum temperature recorded, 22°-23°F, occurred at about 100 ft. depth. The surveying methods used are discussed.

SIP U5687

Joset, Alain
REPORT ON THE SEISMIC EXPLORATION. APPENDIX: AN ELECTRIC PHENOMENON OBSERVED. (Rapport sur l'exploration séismique. Annexe: Phénomène électrique observé; Text in French). p.41-44 incl. table, map. (In: Travaux en Islande 1950-1951, Rapports préliminaires sér. sci. No. 18, [1951])
Arctic Inst. N. Am.

Seismic soundings by means of the reflection method were conducted on the Vatnajökull in 44 locations distributed over a distance of 500 km. Good results were obtained at 28 places. Charges were released as far as 1000 m. from the seismograph to determine wave propagation speeds in depth. The maximum propagation speed observed in longitudinal waves was 3900 m./sec. The ice measured from 370-1040 m. in thickness. The underlying soil is on the same level as the terrain surrounding the glacier. Accumulation depends entirely on heavy precipitation provoked by the glacier surface. A sharp decline in the potential of a radio antenna was observed and attributed to a violent snowstorm.

SIP U5688

Webster, D. A.
DE-ICING TESTS OF NESA DOUBLE GLASS WINDSHIELD. Rept. No. 8392, Lockheed Aircraft Corp. 17p. incl. illus. tables, graphs, diagrs. appendix A, Jan. 29, 1952.
ASTIA, AD 5126

Laboratory conditions under which anti- and de-icing characteristics of a Nesa double glass windshield were determined are described. Two outer flat windshield panels with graded Nesa film thickness capable of producing uniform heating of non-rectangular glass were built, mounted and tested under simulated flight conditions. Tests at a normal blast air velocity of 140-150 m. p. h. and an initial blast temperature of about 0°F were made, with and without frame heating. Replicas of dry runs, anticipated icing conditions, and icing not anticipated were obtained respectively by providing no water for icing, 100% power applied 1-2 min. prior to icing, 1 min. at 40% power preheat and then 100% power and icing started together. The windshield was partially cleared without- and completely cleared with- frame heating, under icing anticipated conditions. The windshield was iced over without- and partially cleared with- frame heating under icing not anticipated conditions. De-icing failed in both cases.

SIP U5689

The Engineer School
ARCTIC CONSTRUCTION: BUILDINGS AND UTILITIES. Conference Note XI 3, 17p. incl. illus. diagrs. Oct. 1951.
AMAU, M-35330-NC, No. 11-3

Notes on the construction of buildings and utilities in the arctic are presented in an instructional guide. Stability of foundation material is a requisite for a building site. Buildings must be able to withstand snow loads and wind speeds up to 100 m. p. h., they should be dispersed to minimize fire hazards but grouped functionally. Foundations directly over permafrost are supported on pilings driven into prethawed permafrost preferably between Feb. and June when the ground offers maximum stability. Methods to prevent heaving of piles are discussed. Structures are also erected on a concrete slab resting on a gravel mat. The mat should be 3-4 ft. thick and extend well beyond the limits of the building. The surrounding area should remain undisturbed. Quonset huts are not satisfactory in the arctic; tropical huts of wood are more suitable. A deep well is the most dependable water source. Collection galleries offer the best means of intercepting water from multiple springs. Water storage facilities and distribution systems are discussed. Sewage is disposed by piping or pumping directly into lakes, rivers or tidal waters. Garbage and rubbish are burned in open dumps. The utilidor, an insulated conduit for carrying all the utility lines, is recommended for large installations. Bending of the lines should be avoided.

SIP U5690

The Engineer School
ARCTIC CONSTRUCTION: ROADS AND AIRFIELDS. Conference Note XI 2, 15p. incl. illus. diagrs. May 1951.
AMAU, M-35330-NC, No. 11-2

Notes on the construction of roads and airfields in the arctic are presented in an instructional guide. The variety of soil conditions makes the construction of roads and airfields difficult and a detailed survey of underground conditions is necessary. The features to be investigated are enumerated and the factors contributing to road failure are discussed. The effect of fills and cuts on the thermal regime is analyzed. Methods of creating induced fields of surface ice to prevent the ice from engulfing the road are presented. Basic rules for the construction of roads on silty soils are given. Gravel and bitumen make the best surfaces and concrete should be avoided. Pile foundations are recommended as supports in bridging. Piles must be anchored into

the permafrost to a depth at least twice the thickness of the active layer. Coarse granular soil provides the best site for runways. Adequate drainage of all ground water above the permafrost table, a system of surface drainage, and a frost belt outside the operating areas will prevent icing of the airfields.

SIP U5691

The Engineer School
ARCTIC CONSTRUCTION: BASIC PRINCIPLES. Conference Note XI 1, 17p. incl. illus. maps, diagrs. March 1951
AMAU, M-35330-NC, No. 11-1

Basic principles of arctic construction are presented in an instructional guide. The strategic importance of the arctic, especially Alaska is emphasized. The local construction material and the environmental hazards are reviewed. Permafrost terms are defined. Vegetation, topography, and geology associated with permafrost conditions are indicated. Gravel and sand or bedrock are the most suitable types of soils for construction. Clay, silt, and organic soils must be avoided. The destruction caused by swelling of the ground, settling and caving, landslides and slumps is discussed and methods to prevent or control these conditions are given.

SIP U5692

Rîazantseva, Z. A.
NOVAYA ZEMLYA AND FRANZ-JOSEPH LAND. (Novaîa Zemlîa i zemlîa Frantsa-Iosifa; Text in Russian with English summary). Trudy Arkticheskogo Instituta (Leningrad), 79:7-122 incl. tables, map, graphs, 1937. 40 refs.
DLC, G600.L4, v. 79

Data of observations, covering 15 yr. are tabulated and discussed. Mean annual air temperatures varied from -4.6° to -10.5°C with extremes from 23° to -40.7°C. Snow constituted 70-80% of the precipitation. The snow cover usually attained depths of 30-50 cm. with a density of 0.40-0.50. Mountainous terrain and snowstorms with frequencies of 118-161 days/yr, caused irregular distribution of the snow cover, especially on the western coast of Novaya Zemlya. The mean duration of snowstorms was 28.1 hr. in Feb.

SIP U5693

Edel'shtein, IA. S.
ADDITIONAL NOTES ON SOME FORMS OF MICRORELIEF. (Dopolnitel'nye zamechaniîa o nekotorykh formakh mikrorel'efa; Text in Russian). p.167-176 incl. illus. (In: Osnovy geomorfologii, by IA. S. Edel-shtein, Moscow-Leningrad, Gosgeoizdat, 1947). 1 ref.
DLC, GB54.E34, 1947

Stone polygons, hexa-or pentagonal, structural, regularly or irregularly shaped grounds and characteristic soil formations in polar zones develop only on a level surface as a network with a diam. of 2 m. and greater. The characteristics of stone polygons are described. The polygons are classified into ground formations between stones, stone polygons and fields or stripes of stone polygons. Cellular or honeycombed soils are formed on grounds composed of homogeneous, fine material. These formations are found in tundra regions, Anadyr, the lower Enisei, Taimir and polar Ural Mountains, have a diam. of 1-4 m., and are free of vegetation. Tetragonal grounds are found in arctic tundra above 72° N. lat., in the North Kharaul and Byrang Mountains, and are characterized by separate fissures of up to 1 m. deep. Freezing water in the cracks heaves the soil and causes small elevations 2-3 m. wide and 0.5-0.75 m. high over the surface of the central portion of tetragonal ground.

SIP U5694

Solomentsev, N. A.
INSTRUMENTS FOR MEASURING THE THICKNESS OF SNOW, ICE AND FRAZIL ICE. (Pribory dlîa izmereniîa tolshchiny snega, l'da i shugi; Text in Russian) p.341-345 incl. illus. diagrs. (In: Gidrometriîa, by N. A. Solomentsev, Leningrad, Gidrometeoizdat, 1950)
DLC, TC175.S65, 1950

Holes are drilled in ice with a steel rod, 0.6-0.7 m. long topped by a wooden handle, an ice borer, or a drill 4 cm. in diam. with a brace. The illustrated ice drill is also used for measuring ice thickness. The rod of the borer is 1 m. long, 7-8 cm. in. diam. and is equipped with teeth at the lower end, a metallic head at the upper end and a hole at the side for removing the refuse. Description and operation are given regarding ice-measuring rods, Gimebluro's rod, Dobrynskii's and Grošev's devices for measuring frazil ice.

SIP U5695

Sarrasin, A.
PROTECTION AGAINST ROCK FALL AND AVALANCHES. (Protection contre les chutes de pierres et les avalanches; Text in French and German). Strasse u. Verkehr, 39:193-194 incl. diagrs. 1953.
DLC, TE3.S755, v. 39

Protective galleries erected to keep a road open all year in Switzerland are described. Forces continually acting on the structure include the weight of the gallery, the pressure of the mountain, and the weight of the ground covering on the roof of the gallery. Temporary forces include the weight of the avalanche, the dynamic effect of an abnormal movement of the snow masses, and the forces parallel to the roof acting as the result of snow friction. The structures were calculated on the basis of a 4 to 8-in. snow depth, a snow weight of 640 kg./cu. m., and an equal load distribution.

SIP U5696

5030th Air Base Squadron, Marks A. F. B.
ARCTIC SHELTERS. Lecture for Arctic Indoctrination School, Pt. V, 12p. March 22, 1949. 5 refs. (typed ms.)
AMAU, M-34373-8-NC

Lecture notes on the types of shelters used in the arctic, construction materials available, factors that influence the campsite and the type of shelter to be used, and basic steps in construction of each shelter type are presented. Evaluation of the equipment at hand should be made to assure that each piece is used to the best advantage. A snow hole covered by a parachute makes an excellent emergency shelter. Shelters should be mosquito-proof and water-proof in summer and provide protection from cold and wind and be easily heated in winter.

SIP U5697

5030th Air Base Squadron, Marks A. F. B.
ARCTIC TRAVEL. Lecture for Arctic Indoctrination School, Pt. VIII, 15p. March 28, 1949. 5 refs. (typed ms.)
AMAU, M-34373-13-NC

Lecture notes outlining the basic requirements and techniques for successful arctic travel and the danger areas to be avoided are presented. Survivors of a crash should stay with the aircraft and await rescue unless they are on unsafe terrain or when the site is endangered by natural hazards. Basic requirements of travel include locational knowledge of the point of departure and the objective of the journey; knowledge of orientation methods and means of confirming the course chosen; physical stamina and suitable clothing; food, fuel, shelter or equipment capable of producing them. High mountains, edges of ice caps and glaciers should not be traversed without expert guidance and a minimum party of 3.

SIP U5698

Imai, I.
ON THE MEASUREMENT OF LIQUID WATER CONTENT IN FOGS AND CLOUDS BELOW 0°C. (Ummu no ka-reikyaku suiteki-ryô no sokutei ni tsuite; Text in Japanese with English summary). J. Meteorological Soc. Japan, 22:322-332 incl. tables, graphs, diagrs. Oct. 1944. 14 refs.
DWB, M(05) M589sj, v. 22

A circular wire netting mounted in front of a hand anemometer was used to measure the amount of supercooled water in fog. The apparatus is based on the assumption that the collection efficiency of a thin wire is nearly equal to unity. The water content is obtained from the wind velocity and the weight of the ice deposited on the wire. The error can be held below 10% with careful operation. The water content in fog rising along mountain slopes is less than 0.5 gm./cu. m. at temperatures between 0° and -10°C. The relation between water content and visibility in fog is discussed and a value of 2.1 is obtained for the constant in Trabert's formula. Intermixed ice particles appear to have little effect on visibility. (Author's abstract)

SIP U5699

Joset, Alain
SEISMIC SOUNDINGS. (Sondages séismiques; Text in French). p.43-56 incl. illus. table, graphs, diagrs. (In: Campagne au Groenland 1950, Rapports préliminaires sér. sci. No. 15, [1950])
Arctic Inst. N. Am.

Seismic soundings and gravimetric studies were conducted on the Greenland Ice Cap at elevations ranging from 1096-2930 m. over 2000 km. The equipment is listed, its installation described and the working plan outlined. Charges were released on the snow-covered inland ice at 400-600 m. from the seismograph, and inside bore holes as deep as 150 m. below the surface. Longitudinal waves from charges on new snow, 10 m. deep, had a velocity of 1000-1200 m./sec. The velocity increased to 2000 m./sec. at 20 m. and 3000 m./sec. at 50 m. depth, obtaining the maximum at 150 m. depth. Wave velocity as a function of depth may be derived from the time curve. Ice thickness was evaluated at 800-3350 m. Wave reflections indicate that different soil layers, 100-200 m. thick, exist below the inland ice. Mountain chains and moderately inclined slopes and valleys at 200-300 m. below sea level were ascertained. Refraction waves appeared on a research site 25 km. from the edge of the icecap and were absent at 90 km. from the edge. Suggestions for the continuation of the studies are presented. (See also SIP U4001)

SIP U5700

Perez, Michel
GLACIOLOGY. (Glaciologie; Text in French). p.65-86 incl. illus. tables, diagr. (In: Campagne au Groenland 1950, Rapports préliminaires sér. sci. No. 15, [1950])
Arctic Inst. N. Am.

The equipment used for glaciological research on the Greenland Ice Cap during the winter of 1950-51 is listed. Wooden survey poles were set up in the ablation zone, forming a rectangular base and converging to form a pyramid to insure stability and minimum weight. Tubular Al poles were erected in the accumulation zone. Snow stratifications were studies by photography, ramming, density and hardness profiles. Snow temperature distribution was measured with Hg, alcohol, and resistence thermometers and thermoelectric couples. Borings with various thermic drills to a depth of 30.50 m. indicated a density increase from 0.51 at 5 m. to 0.68 at 30 m. depth. Snow accumulation values recorded at 26 stations from June 24 - Aug. 26 ranged from 5-20 cm. Ablation values recorded at 6 stations on new snow surfaces were 4, 5, 14, 25, 47 and 51 cm. Mean values of 10-day temperatures measured to 10 m. depth are tabulated, indicating a low of -29.2°C at 5-m. depth. (See also SIP U4002)

SIP U5701

Stahl, Pierre
PHYSICS OF THE ATMOSPHERE. (Physique atmosphérique; Text in French). p.87-116 incl. tables. (In: Campagne au Groenland 1950, Rapports préliminaires sér. sci. No. 15 [1951]) 8 refs.
Arctic Inst. N. Am.

Measurements of air electricity and pollution started in 1948 were continued with new equipment. The ionization of the air in a bore hole in the firn cover was higher in the upper part of the hole than at 70-150 cm. above the surface. Electric conductivity decreases sharply when passing from the soil onto the ice and increases with altitude. The dissymmetry between positive and negative air conductivity increases faster over the inland ice than in the free atmosphere. Meteorological observations, altimetric measurements and optical phenomena in the atmosphere over the inland ice are discussed. It is recommended to continue research on conductivity at various levels in the air and in the snow cover, and on radioactivity of new snow, firn and ice.

SIP U5702

Canada. RCAF Survival Training School
ARCTIC SURVIVAL LECTURES. Lectures A-P, [115]p. incl. diagrs. [1949]. (typed ms.)
AMAU, M-35312-NC

A series of 16 lectures covering the following topics are presented: the geography of Canada and its application to survival, the arctic, the natives, living off the country, shelters, fire methods, hunting and fishing, the importance of water and food in the arctic, care of equipment and clothing, care of firearms, signal, operation of the Gibson Girl radio, first aid, the mosquito and fly problem in the arctic, emergency navigation, and travel.

SIP U5703

Ethnogeographic Board
PARTIAL LIST OF SURVIVAL MANUALS AND ARTICLES. 14p. [1943]. (typed ms.)
AMAU, M-34552-NC

A bibliography of approximately 200 entries is presented. The material is grouped under the headings of General, Arctic, Desert, Sea, and Tropics and arranged alphabetically according to title within the groups.

SIP U5704

Germany. Generalstab des Heeres
FINNISH EXPERIENCES IN WINTER WARFARE. (Finnische Erfahrungen im Winterkrieg; Text in German). Explanations for slide series 133, 44p. incl. illus. diagrs. 1943.
AMAU, 355.4G373f

Reproductions of forty 5 x 5-cm. glass slides with explanations are presented, indicating the construction details of auxiliary shelters, garages, and sleds for winter warfare. Simple birch or pine sled designs (Finnish purilas) are described and methods of heating the shelters and garages are indicated.

SIP U5705

Young, Edward R.
ARCTIC AIR INSTALLATIONS CONSTRUCTION PROBLEMS. Air U. Maxwell Air Force Base, Ala. 154p. incl. illus. map, March 1948. (Thesis, typed ms.) [80] refs.
AMAU, M-32984-NC Y71a

The transportation problems, the climatic conditions and their effect on the physical well-being and the moral of personnel make installation construction in the arctic difficult. The problems of temporary installations including the construction of runways and structures, the sanitary provisions needed, the maintenance of the facilities and their dismanteling on continuous ice or snow and in areas of seasonal snow are discussed. The construction problems of permanent air installations in permafrost are reviewed. The topics covered include: reconnaissance and site selection, the planning and starting of construction, design and construction, maintenance of runways and roads, buildings, maintenance of buildings, water supply and distribution, and waste disposal.

SIP U5706

5030th Air Base Squadron, Marks A. F. B.
ARCTIC EMERGENCY EQUIPMENT. Lecture for Arctic Indoctrination School. Pt. II-A, 22p. March 10, 1949.
AMAU, M-34373-5-NC

The preparation and care of emergency equipment is a matter of individual responsibility. Type E-12 arctic emergency kits are often issued without rations and with a gasoline can without gasoline. Food and gasoline should be checked and procured if necessary. The basic items of the survival equipment in order of their relative importance in emergency are: first aid equipment, signaling equipment, shelter, heat, and food. Tools should be stuck in the snow, never put flat against it. Shovel and saw should be kept inside the shelter. The sleeping bag should be opened wide every morning to let out moist warm air, aired every 2-3 days and beaten to restore the resiliency of the feathers. Modification of available survival equipment items and fabrication of new ones are discussed. The importance of removing snow from clothing and equipment is emphasized. Various energency kits and their contents are described.

SIP U5707

Hayes, Ralph
SAFE HAULING ON ICE. 4p. incl. maps, diagr. [1938].
AMAU, 386.49 H418s

The transportation practices followed in hauling 3500 cu. yd. of riprap and 1400 cu. yd. of crushed rock over about 1 mi. of slough ice and a deep bay to Fountain City's (Wis.) protection dike, and 7000 cu. yd. of riprap and 1000 cu. yd. of crushed rock across the lower end of Pool 5A of the Mississippi River are described. Freezing began on Jan. 3, and 9 in. of clear ice had formed under 6 in. of snow across the bay by Jan. 8. The ice thickened to 16 in. by Jan. 14 on a 75-ft. roadway cleared of snow, and to 12 in. off the cleared road. Two 2-plank wide runways laid at wheel spacing on 1 in. x 12 in. x 12 ft.-cross-cleats placed 8 ft. apart, were frozen in the roadway by flooding and used to move 500 cu. yd. of material/day at 35-40 m.p.h. The 3 to 5-ft. deep sloughs were covered with ice 15-17 in. thick. Roadways 30 ft. wide were kept clear of snow and used alternately, allowing 1 day for use and 2 nights and 1 day for resting and recuperation of each ice road. Planks, cleats and flooding were used at Dike 5A on ice over running water, with daily borings made, up and down stream, to detect ice thinning by the water current. Ice 8-9 in. thick will support a truck with a 3-cu. yd. load moving slowly; ice 20-26 in. thick will carry 3.5-cu. yd. loads moving at 30-40 m.p.h. Ice should be planked against breaking down from fatigue. Cab doors should be wired open to prevent trapping of the driver in case of ice failure. Snow must be kept off the roadway because slush will penetrate 3-6 in. of ice at temperatures well below zero.

SIP U5708

BIBLIOGRAPHY ON ARCTIC SURVIVAL. 4p. Feb. 12, 1944. (typed ms.)
AMAU, M-34586-NC

A bibliography of 67 entries is presented. The material is grouped under the headings of General, Arctic Survival Manuals, Ocean Survival Manuals, and Selected References on Woodcraft and Camping.

SIP U5709

U. S. Troops, Big Delta. Headquarters
REPAIR AND UTILITIES PROBLEMS IN THE ARCTIC-BIG DELTA, ALASKA. 4p. [1949]. (typed ms.)
AMAU, M-34373-1-NC

Snow removal equipment consists of 2 Oshkosh Sno-Goes used primarily to remove deep snow, 3 truck-mounted snowplows, and two 12-ft. motorized graders. Wells are dug through several ft. of permafrost. Water distribution lines, steam distribution and return lines, and the sewer lines are enclosed in wooden utilidors 8-10 ft. below the ground surface. Fire fighting in extremely cold weather is discussed.

SIP U5710

Germany. Oberkommando des Heeres
MANUAL FOR WINTER WARFARE. (Taschenbuch für den Winterkrieg; Text in German). Merkblatt 155, Aug. 5, 1942, 372p. incl. illus. tables, diagrs.
AMAU, 355.4G373t

Russian snow and thawing conditions are reviewed. Winter operations including marching, orientation on snow-covered terrain, snowplowing and compacting, road marking and construction, and camping are discussed. Practical guidance is presented for constructing and erecting snow fences, combating skidding on snow and glaze, determining ice thickness and supporting strength, fortifying ice covers and constructing ice bridges. Temporary shelters include snow holes, caves, houses and igloos, tents, and soil and pine branch huts. Permanent dwellings, winter camouflage, clothing, equipment, nutrition, hygiene and weapons are discussed. Bibliographies of German military publications and films on winter warfare are included.

SIP U5711

Smolin, A. P.
SOME PROBLEMS IN THE USE OF AIRPLANE SKIS. (Nekotorye voprosy ekspluatatsii samoletnykh lyzh; Text in Russian). Vestnik Vozdushnogo Flota, 21, No. 11:67-77 incl. illus. graph, diagrs. 1938.
DLC, TL504.V45, v. 21

The disconnection or stretching of the ski retainer in flight is the main source of accident associated with the use of airplane skis. Disconnection may be due to the breaking of a check cable of improper diam., loosening of screw connections, or tearing out of the shock cord insert. Stretching of the ski retainer may be due to freezing at low temperatures. Other accidents are due to defects caused by the rotting of the inner framework and runners, improper reconditioning or faulty assembly, unsuitable composition, or low structural stability. Skis should be substituted for wheels when the depth of the snow cover is 0.5 times the diam. of the wheel. Methods of overcoming adhesion of the skis to the snow are discussed. The only comparatively reliable method consists of coating the contact surfaces with nitrolac. Basic precautions for the use of airplane skis are given. Tests indicate that only rigid connections should be used for ski fittings and that the retracting mechanism should be maintained. The specific pressure of the skis should not exceed 700 kg./sq. m. in order to be used on various types of snow covers.

SIP U5712

Smolin, A. P.
SOME PROBLEMS IN THE USE OF AIRPLANE SKIS. Transl. No. 1, Air Service Command, 8p. illus. graph, diagrs. June 1943.
AMAU, M-34473-NC, No. 1

See SIP U5711

SIP U5713

PRECIPITATION, SNOW COVER EVAPORATION AND CONDENSATION. (Osadki, snegovoĭ pokrov, isparenie i condensatsiia; Text in Russian). Spravochnik po vodnym resursam, 15:607-635 incl. tables, graphs, map, diagrs. 1937.
DLC, GB746.S75, v. 15

Precipitation has been measured at Barnaul (Western Siberia) since 1838. Precipitation data of 149 stations and snow cover data of 63 places from 1838-1930 are tabulated. The snow cover forms during Oct. and attains a maximum depth in Feb. or March. The mean maximum of depth varied from 27-40 cm. in the southwestern steppe to 60-95 cm. in the northeast. The absolute maximum varied from 61-199 cm. Mountain regions crossed by the 3500-m. snow line are subjected to snow precipitation throughout the summer.

SIP U5714

OPENING AND FREEZING OF RIVERS AND LAKES. (Vskrytie i zamerzanie rek i ozer; Text in Russian). Spravochnik po vodnym resursam, 15:656-668 incl. tables, 1937.
DLC, GB746.S75, v. 15

Data on river freezing and opening in Western Siberia from 1881-1930 are tabulated. The variety of physiographical conditions over such a large territory is reflected by wide differences in freezing and opening dates. The break-up of the upper stream of the Irtysh River is observed at the beginning of April. The opening processes are completed in the estuary of the Ob River near Salekhard by the middle of May. The average duration of spring ice drift for the Ob and Irtysh rivers was 5-11 days, with a maximum up to 20-25 days. Winter freezing started on Oct. 20. Rivers of Western Siberia are ice-covered for an average of 150-160 days in the south and 180-240 days in the north.

SIP U5715

GENERAL CHARACTERISTICS OF THE ICE REGIME IN RIVERS AND LAKES. (Obshchaîa kharakteristika ledovogo rezhima rek i ozer; Text in Russian). Spravochnik po vodnym resursam, 15:668-674 incl. tables, map, 1937.
DLC, GB746.S75, v. 15

Severe freezing in Western Siberia contributes to the formation of a thick ice cover on rivers and lakes. A very irregular distribution of ice thickness is observed on the rivers of mountainous regions. Mountain rivers often descend along steep slopes and remain ice-free during a long period. Intensive supercooling induces the formation of anchor ice, which blocks the narrow part of the river and causes an increase in the water level, and the formation of naleds in the lower ice-covered parts of the river. Rivers in mountainous regions attain a maximum ice thickness of 75-100 cm. in March-April. Rivers in the plains attain a maximum ice thickness of 75-150 cm. in April. An earlier date can be expected in the southern steppe zone, and a later date in the northern tundra zone. The ice regime of lakes in the plains area does not differ from the river regime, but the thickness of the ice cover is usually twice that of river ice. Salt lakes remain unfrozen throughout the winter.

SIP U5716

SOIL FREEZING. (Promerzanie pochvy; Text in Russian). Spravochnik po vodnym resursam, 15:674-681 incl. tables, 1937.
DLC, GB746.S75, v. 15

Soil temperature data of Western Siberia from 1895-1931 are tabulated. The soil usually begins to freeze in Oct. and reaches a maximum frost penetration in March. Complete soil thawing occurs in May for the steppe, and in June for the taiga. Complete thawing was observed at Tatarsk at the beginning of July. The maximum frost penetration was about 250 cm. at Tatarsk and Barnaul, 2 m. in the south taiga, diminishing to 1.5 m. northward.

SIP U5717

PERMAFROST. (Vechnaîa merzlota; Text in Russian). Spravochnik po vodnym resursam, 15:681-683 incl. map, 1937.
DLC, GB746.S75, v. 15

The southern boundary of permafrost in Western Siberia is along 65° 30' N. lat. Permafrost was found at a depth of 79 cm. in the tundra region between the Kara and the Ob rivers. The depth of permafrost in the lower section of the Ob basin was near 6.40 m. The permafrost layer near Salekhard was about 5 m. thick.

SIP U5718

Messinger, B. L.
AIRCRAFT DE-ICING. S.A.E. Journal, 61, No. 2:40 incl. graph, Feb. 1953.
DLC, TL1.S5, v. 61

A new type of cyclic heating element permitting the exploring of intensities ranging up to 80 w./sq. in. was developed. An optimum occurs at about 40 w./sq. in. for an energized period of 2 sec. Other advantages of the element are high efficiency, small thermal mass, ability to produce instantly uniformity of surface temperature, and aerodynamic smoothness. The large number of individual segments or circuits required to maintain a continuous and uniform power load is a drawback of the new system, which like all other de-icing systems, suffers from the finite drag increment due to ice accumulating during the de-energized period of the cycle.

SIP U5719

Shanahan, Lawrence W. and Frank L. Robertson
ARMY ENGINEER CLIMATIC TESTS. Military Engr. 45:264-268 incl. illus. July-Aug. 1953.
DLC, TA1.P85, v. 45

Results of arctic tests of engineer equipment conducted at Fort Churchill (Can.) during the winter of 1952 are presented. The performance of the mobile fire protection unit in conjunction with a mobile steam generator was checked at low temperatures.

Time constants for freezing of water storage tanks and the amount of heating required for thawing were determined. Water in specially equipped 1000-barrel tanks was periodically checked for ice formation. Portable water purification equipment tests provided additional drinking water for Churchill. Buildings were tested for occupational comfort, as housing for water supply equipment, and ease of erection and dismantlement. Other tests conducted include low temperature starting and operation of engines, the effectiveness of an ice fog eliminator, the body insulation efficiency of the map compilation van, and extreme temperature exposure tests on base plastics, marking paints, protective coatings and screens. Several road construction tests were started, records of construction and performance under traffic are maintained to determine the most effective construction method. Results of desert tests conducted at the Yuma test station during the summer of 1952 are also presented.

SIP U5720

Wexler, Raymond and Roland J. Boucher
HEAT BALANCE OF A GROWING ICE PARTICLE. Sci. Rept. No. 2, Mt. Wash. Observatory, 7p. incl. tables, graphs, June 30, 1952. 4 refs. (Contract AF 19(122)-399)
ASTIA, U25141

Temperature and vapor density differences between the ambient air and an ice crystal growing by diffusion in clouds along saturated adiabats of 18°, 14°, 10°, and 6°C are determined at temperatures from 0° to -30°C from the heat balance equation. These values are tabulated. Values for the 18° and 6°C saturated adiabats are plotted. The maximum rate of growth of ice crystals occurs between -18° and -20°C.

SIP U5721

[Browne], Belmore
[SHELTERS]. 5p. Nov. 8, 1943. (typed letter to Henry I. Baldwin)
AMAU, M-34556-NC

The inadequacy of bough shelters for use in Alaska, Yukon Ter., B. C. and northern Can. is indicated. Such shelters are neither windproof, cave-proof nor snow-proof and offer no reflected heat from fire. Kåta shelters are unsastisfactory emergency shelters because of difficult erection, uncertain draft, darkness and unpleasantness during daylight. Insulation is necessary when sleeping on the ground. Snow of the sleeping and fire area must be stamp-packed to firm consistency first with snowshoes, then with feet. Packed snow covered with boughs provides an excellent sleeping surface. A windbreak of timbers is preferable to a snow wall. Standard methods of successful fire building are given. A fire kept level with the surroundings insures draft and warmth; a sunken fire is unsatisfactory. Brief comments on 2 packstraps are made.

SIP U5722

PRECIPITATION, SNOW COVER, SATURATION DEFICIT AND EVAPORATION. (Osadki, snegovoĭ pokrov, nedostatok nasyshcheniîa i isparenie; Text in Russian). Spravochnik po vodnym resursam, 12:673-744 incl. tables, graphs, maps, 1936.
DLC, GB746.S75, v. 12

Data from many parts of the Ural and neighboring regions from 1836-1930 are mapped and tabulated. The secular trend of precipitation is shown on graphs and discussed. The distribution of the snow cover over the territory varied widely. Snow covers the soil surface during 70-80 days in the southern part (Emba River basin) with a mean depth near 10 cm. The mean depth of the snow cover reached 274 cm. in the northern Ural and the snow cover lasted an average of 202 days. The earliest appearance of a snow cover was observed near Oct. 15 in the northeastern Ural, and the latest near Dec. 15-25 in the south. The snow cover disappears during April 1-20 beginning in the south. Snowdrifts and thawing weather change the depth and density of the snow cover, which was 0.33-0.36. Wide variations in snow-melt intensity from 0.7-2.6 cm./day were noted and are attributed to geographical latitude and local peculiarities.

SIP U5723

OPENING AND FREEZING OF THE RIVERS AND LAKES. (Vskrytie i zamerzanie rek i ozer; Text in Russian). Spravochnik po vodnym resursam, 12: 779-800 incl. tables, 1936.
DLC, GB746.S75, v. 12

Dates of river freezing and opening in the Ural and neighboring regions are tabulated for the period 1881-1930. The freeze-up begins near the middle of Oct. in the northeastern Ural. The usual time of spring break-up is April. The opening is completed during the first part of May. Ice drifts occur on 2-8 days in spring, and 2-15 days in autumn. The rivers of the Kama and Tobol basin are ice-free for 140-210 days, and those of the Ural basin for 170-259 days. The average period of lake freezing was from the end of Sept. to the end of Nov. The spring opening was between the end of March and May 28-29.

SIP U5724

GENERAL CHARACTERISTICS OF THE ICE REGIME IN THE RIVERS AND LAKES. (Obshchaîa kharakteristika ledovogo rezhima rek i ozer; Text in Russian). Spravochnik po vodnym resursam, 12:800-807 incl.tables, map, 1936.
DLC, GB746.S75, v. 12

Extensive anchor and frazil ice formations characterize the winter regime of Ural rivers. These formations disrupt hydrotechnical construction by blocking narrow sections of the river and contributing to the formation of naleds. Ice usually reaches a maximum thickness during March, and grows most rapidly during the first 2 months of win-

ter. The maximum thickness of the ice cover was 150 cm. A thickness exceeding 100 cm. was observed in 27% of the stations and from 40-100 cm. in 73%. The mean maximum thickness varied from 50-69 cm. for western slopes, 25-101 cm. for eastern slopes, and 50-102 cm. for south Ural rivers. Freezing processes begin earlier and average ice thickness is greater in lakes than that in rivers. When river ice is 55-60 cm. thick, lake ice has reached a thickness of 90 cm. Many salt-water lakes remain ice-free throughout the winter.

SIP U5725

SOIL FREEZING. (Promerzanie pochvy; Text in Russian). Spravochnik po vodnym resursam, 12: 807-815 incl. tables, map, 1936.
DLC, GB746.S75, v. 12

Soil freezing data in the Ural and neighboring regions from 1899-1931 are given. Mean data of soil freezing to depths of 1.0-3.2 m. are tabulated. Soil freezing begins in Oct., and the soil is completely thawed during April. A scant snow cover in the southern regions causes deeper frost penetration into the soil. The soil was frozen an average of 134-167 days at a depth of 0.2 m., and from 0-134 days at a depth of 0.8 m. A maximum frost penetration of 188-217 cm. occurred in the northern and central parts of the Ural; a maximum penetration of 157 cm. occurred in Chka'lov in the south. The depth of ice formations in the soil does not depend on the depth of frost penetration. Ice was found at a depth of 107 cm. in Ufa, with frost penetrating to 125 cm. Ice was found at a depth of only 41 cm. in Chka'lov, with frost penetrating to 140 cm. The differences are attributed to variations in soil composition and moisture.

SIP U5726

Voznesenskiĭ, A. V.
SNOW COVER. (Snegovoĭ pokrov; Text in Russian). Spravochnik po vodnym resursam, 5:29-32, 456-459, tables, maps, 1934. 2 refs.
DLC, GB746.S75, v. 5

Snow cover data from 84 stations in the Lower Volga region are mapped and tabulated. Unstable winter conditions induced wide variations in duration, distribution, and depth of the snow cover. The snow cover lasted an average of 161 days in the northeast and 72 days in the Kuma River area in the south. The snow cover is scant and unstable near the Caspian Sea Coast. The average depth of the snow cover attains a maximum of 40-60 cm. in the northern part to less than 20 cm. south of 50°N. lat. The snow cover in forests was 70% deeper than in open fields. A snow-melt rate of 0.92 cm./day in open fields increased up to 1.45 cm./day in the forests.

SIP U5727

Spengler, O. A.
OPENING AND FREEZING OF THE RIVERS. (Vskrytie i zamerzanie rek; Text in Russian). Spravochnik po vodnym resursam, 5:487-494 incl. tables, 1934.
DLC, GB746.S75, v. 5

Mean and extreme data of river freeze-up and break-up in the Lower Volga region for periods of 10-45 yr. are tabulated. The average dates of autumn freezing are Nov. 23 in the north and Dec. 13-15 in the south. Spring opening occurs from March 19-April 18 from south to north. The autumn ice drift lasts from 3-8 days in the south to 20-25 days in the north. Spring ice drift continued an average of 10-14 days in the Volga, and 4-5 days in other rivers. Navigation on the Volga is possible during 190 days (north) and 255 days (mouth). Navigation is feasible for 210-220 days on other rivers.

SIP U5728

Benterud, O.
REPORT FROM THE NORDIC ROAD TECHNICAL UNION'S MEETING IN FINLAND FOR DISCUSSION OF WINTER MAINTENANCE. (Rapport fra Nordisk Vegteknisk Forbunds møte i Finland for drøftelse av vintervedlikeholdet; Text in Norwegian). Medd. Vegdirektøren, No. 3:32-37, March 1949.
DLC, Unbound periodical

Snow fences, winter road maintenance and snowplows were discussed at the meeting of Feb. 1948. Studies on snowdrifts and various kinds of snow fences and hedges indicate the superiority of snow hedges. A winter road should not be covered by more than 3-4 cm. of ice. Sanding costs are reduced in Sweden by using ice rakes with steel teeth to groove the ice cover. Sand 2-7 mm. in diam. mixed with salt was considered most suitable for sanding roads. A table indicates the percentages of $CaCl_2$ and NaCl to be used at -12 to -29°C and at -12 to -20.5°C. respectively. Different types of snowplows were tested to determine discharge in relation to speed and snow conditions, angle of trajectory and distribution of the discharged snow in the direction of movement. The resistance of the plow at various speeds was checked and its net effect was determined mathematically. The graph indicates that the discharge effect rises steadily up to 45 km./hr. when it is increasingly influenced by air resistance. Light and heavy snow was thrown about the same distance.

SIP U5729

Willumsen, T.
BARSTAD'S PLOW. (Barstadplogen; Text in Norwegian). Norsk Vegtids. No. 12:207-208 incl. illus. Dec. 1952.
DLC, Unbound periodical

The chassis of a truck is equipped in the rear with a plow that can be shifted from left to right and vice versa. Snow from the blocked side of the road is

transferred to a convenient cleared area by shifting the plow. A second truck with a front plow removes the transferred snow. The plow operates effectively at speeds of 10-30 km./hr. This device is considered almost indispensable for removing heavy snowdrifts from narrow mountain roads.

SIP U5730

LIVE SNOW HEDGES. (Levende snehegn; Text in Danish). Medd. Vegdirektøren, No. 2:26-27, Feb. 1949.
DLC, Unbound periodical

The Danish delegation to the Nordic Road-Technical Union's meeting reports that fir and spruce trees provide good protection when planted in 2-3 rows spaced equidistantly on the diagonal. The Danish State Railways used spruce hedges but found that 2 parallel low-cut hedges with the outer row on a dike 25 m. from the tracks provided better protection against drifting snow. Hedges planted in Sweden to protect fruit trees against sand have supplanted artificial snow fences in winter. It is believed that planting birch and fir in northern Sweden will effectively replace artificial snow fences. Norwegian experiments showed that live hedges were more effective, less expensive and an improvement of the landscape. German experiments with low beech hedges, and low and high spruce hedges showed good snow accumulative capacities regardless of large percentages of open spaces. No definite conclusions are drawn.

SIP U5731

Abrahamsen, S. and P. Dam Olsen
SNOW REMOVAL UNDER ADVERSE CONDITIONS. (Snerydning under vanskelige forhold; Text in Danish). Stads- og Havneingeniøren, 44:50-51, April 1953.
DLC, Unbound periodical

Frequent temperature variations during Jan.-Feb. converted the snow cover into an ice cover at Kongens Lyngby (Denmark). Compression by traffic produced rough, uneven street surfaces. The equipment available consisted of field tractors with and without tire chains and caterpillar bulldozers. The ice cover was cracked by the weight of the vehicles effectively manipulated, and the loosened ice was removed by plows and sweepers. Snow falling on damp streets could be removed at temperatures above +1°C; snow falling on dry ground was easy to remove at temperatures below -0°C. One sweeper and 5-6 men cleared about 1 km./day.

SIP U5732

Meng, W. v.
FROST RESISTANT CONCRETE. (Frostbeständiger Beton; Text in German). Strasse u. Autobahn, 4: 152-156 incl. tables, May 1953.
DLC, TE3.S752, v. 4

The production of frost resistant concrete requires the elimination of water saturation through appropriate grain composition, special additives, density controls, and air-entrainment. A formula is presented determining the amounts of cement, additive and water in relation to the specific weights required for producing water-impervious concrete. A concrete, impermeable to water and having a resistance to crushing of 150 kg./cc., is usually frost-resistant. Cement quantities required to produce water-impermeable concrete with sands of various grain sizes are specified. Air entrainment reduces frost action effects by permitting the flow of excess water from the capillary into the air pores and preventing disruption of capillary pores due to frost expansion of the enclosed water. An increase in the proportion of entrained air causes decrease of the water cement value and of the 90-day crushing resistance and increase of the frost resistance. A porosity of about 4% is recommended. Results of experiments with Frioplast, an air-entraining agent, are tabulated.

SIP U5733

Sheĭnmann, S. M.
THE FIXED THERMAL FIELD AROUND AN INFINITE REGULAR HEXAHEDRAL PRISM PLACED INTO AN INFINITE HOMOGENEOUS MEDIUM. (Stat͡sionarnoe pole temperatury vokrug beskonechnoĭ pravil'noĭ shestigrannoĭ prizmy, pogrushchennoĭ v bezgranichnuû odnorodnuû sredu; Text in Russian with English summary). Trudy Arkticheskogo Instituta (Leningrad), 110:33-38 incl. diagrs. 1938.
DLC, G600.L4, v. 110

The temperature distribution around an ice crystal in supercooled water and other analogous situations in a homogeneous medium is mathematically analyzed. Laplace's equation for a thermal field and simplifications by Schwarz-Christoffel were used for the derivation of the crystal growth in supercooled water.

SIP U5734

Nikolaev, A. F.
SNOW LOAD ON STRUCTURES. (Snegovaû nagruzka na sooruzheniû; Text in Russian). Stroitel', 8, No. 10:18-26 incl. illus. tables, graphs, diagrs. 1935. 5 refs.
DLC, TH4.S83, v. 8

The determination of snow loads on roofs of structures is complicated because the loads depend not only on snow cover thickness, but also on temperature, wind, contours and slope of covering. Frequently the distribution of loads is calculated after testing a model of the structure in an aerodynamic installation. The variations of snow loads as functions of wind velocity and construction peculiarities obtained from many experiments are presented. Formulas and tables for calculation of snow loads in dependence on wind and snow cover depth are suggested.

SIP U5735

Norton, R. W. T.
WINTER GRITTING AND SNOW CLEARING. J. Junior Inst. Engrs. (London), 63:237-252 incl. illus. graph, diagr. May 1953.
DLC, TA1.J8, v. 63

A plant was developed to handle winter problems of snow and frost in a large city in the North Midlands (England) controlling about 700 mi. of roads and streets. The emergency gritting program concentrates first on main roads, bus routes and known danger spots, then on roads of secondary importance and district roads. Boiler ashes, sand or gravel mixed with rock salt are normally used for gritting. The development and improvement of mechanical gritters from 1922 to date are described. The gritter currently used holds the grits in front of the driving wheels, and has an easily adjustable feed. The heavy snowplow now in use is fitted with a 0.187-in. steel blade, 2 ft. high at the center of the road and 3 ft. 9 in. on the nearside and weighs 13 cwt. Small plows for narrow streets include a diagonal-blade plow, a plow carried on a framework constructed from galvanized piping, and the Aveling-Austin grader.

SIP U5736

ARMY ENGINEERS TEST SNOW AND ICE FOR ARMED FORCES. Ice and Refrigeration, 125:35-36 incl. illus. July 1953.
DLC, TP490.I2, v. 125

Arctic snow, ice and frozen ground conditions are studied in laboratories of SIPRE at temperatures ranging from +33° to -68°F to solve or minimize the problems of arctic warfare, transportation, communications, construction, and living conditions. Four rooms are cooled by $CaCl_2$ and 2 by trichloroethylene and maintained at temperatures of +33°, +23°, +15°, -5°, -25°, and -68°F respectively. Most of the work is done in the +23°F laboratory. Ice crystals from Alaska's Mendenhall Glacier and T-3 floating island are studied in the -68°F laboratory. Ice can be planed, turned on a lathe, sanded, drilled, and polished. A 0.75-in. sq. piece of ice at +15°F withstands 300 lb. pressure before crumbling. The permeability of different kinds of snow is also studied.

SIP U5737

Bentley, W. A.
TWENTY YEARS' STUDY OF SNOW CRYSTALS. Monthly Weather Rev. (U. S.), 29:212-214, May 1901.
DLC, QC983.A2, v. 29

More than 800 photographs of snow crystals were secured in a 20-yr. period. Data on temperature, kind and approximate height of clouds, velocity of various cloud strata and surface winds, and hourly changes of crystals for the portions of each storm were secured concurrently with the photographs. The majority of perfect tabular forms of crystals are almost wholly confined to the western and northwestern portions of great storms and blizzards. The distribution of columnar, tabular, and granular crystals in other portions of such great storms is similar for all such storms. Air temperature and humidity at the earth's surface do not influence the form and size of crystals. Crystals deposited by general storms are diversified in form and complex in structure, possess solid nuclei, and often consist of 2 or more varieties associated together. Crystals precipitated from local storms during mild weather are devoid of solid nuclei and are usually of large, frail, branching, tabular form or of similar heavy granular varieties. Crystals precipitated from local storms during intense cold are similar to those of general storms.

SIP U5738

Bentley, Wilson A.
STUDIES AMONG THE SNOW CRYSTALS DURING THE WINTER OF 1901-2, WITH ADDITIONAL DATA COLLECTED DURING PREVIOUS WINTERS. Monthly Weather Rev. (U. S.), 30:607-616 incl. tables, map, 1902. 3 refs.
DLC, QC983.A2, v. 30

An intimate connection exists between form and size of nuclei and the altitude and temperature of the air in which the crystals form. A general law of distribution of the various types of crystals is apparent throughout the different portions of a great storm. The occurrences of perfect crystal forms and other types within the respective quadrants about the storm centers were tabulated from 1897-1902. About 83% of the perfect forms occur within the west and north quadrants of great storms. The classification of snow crystals by form and structure is briefly described. Tables indicate the relative frequency of these various types of crystals in local and general storms, their occurrence and distribution throughout the various portions of great storms, their relation to various cloud strata and their occurrence during various degrees of cold. The modification of the form of snow crystals which occurs during their growth within the clouds, by wind action, close proximity to other crystals, and aggregation of amorphous or granular material is discussed. A chronological list of snow storms and photomicrographs is included.

SIP U5739

[Bentley, W. A.]
SNOW CRYSTALS. Monthly Weather Rev. (U. S.), 29:118, March 1901. (Notes by the editor)
DLC, QC983.A2, v. 29

The character and extent of a snowstorm may be determined by the crystalline forms of the snowfall. A greater number of small, perfect crystals fall in widespread than in local storms. Crystals falling in local storms at very low temperature are similar to those in blizzards. Large, heavy, subcrystalline forms originate in lower cloud layers. Hailstones

originate in granular snow. The snow crystals from higher cloud strata of cold temperature are smaller and less branched than those from lower clouds. Modifications of snow crystals during their fall and the formation of composite crystals are discussed.

SIP U5740

Bekkedahl, Norman
VOLUME DILATOMETRY. J. Research Natl. Bur. Standards, 43:145-156 incl. table. graphs, Aug. 1949. (Research paper RP2016). 40 refs.
DLC, QC1.U52, v. 43

The construction, calibration, and operation of a volume dilatometer are described. This research tool is used to obtain data on volume coefficients of thermal expansion and to study phase changes in solids and liquids. An illustrative calculation is given using data obtained from volume-temperature measurements on a sample of butyl rubber from about -30° to +90°C, using Hg as a confining liquid in the dilatometer. The instrument can give volume expansivity measurements to a precision of about 1%. (Author's abstract)

SIP U5741

Monfore, G. E.
ICE PRESSURE MEASUREMENTS BY MEANS OF INDENTOR GAGES FOR THE WINTER 1950-51. Structural Lab. Rept. No. SP-33, Bureau of Reclamation, 6p. illus. tables, graphs, diagrs. Dec. 12, 1951. 3 refs.
SIPRE files, S-1047

Ice pressures were measured with indentor gages at 4 Colo. reservoirs during the winter 1950-51. The maximum thrust, 17,300 lb./ft. recorded near steep, rocky shores, is in good agreement with previous measurements under similar shore conditions. The maximum thrust recorded by gages located near moderately steep shores was 9400 lb./ft. The highest thrusts recorded at reservoirs with flat, sandy shores were 3600 and 5800 lb./ft. The results indicate that the ice thrust may be influenced by the shore conditions.

SIP U5742

Nordenskiöld, G.
THE INNER STRUCTURE OF SNOW CRYSTALS. Nature, 48:592-594 incl. illus. Oct. 19, 1893.
DLC, Q1.N2, v. 48

A classification of snow crystals is presented distinguishing the 3 main groups of crystals developed in the direction of the vertical axis (hexagonal and bottle-shaped prisms, needles), tabular crystals (hexagonal, stellated and dendritic tables), and crystals equally developed along the vertical and lateral axes. Each type is described in detail. A stellate plate maintained its form and developed upon compression new curvilinear figures analogous to the hexagonal crystals. This analogy suggests a tensional origin of the lines in hexagonal crystals. Hexagonal hoarfrost deposited on window panes were almost free of cavities or organoid figures.

SIP U5743

Pauschmann, G.
SNOW CRYSTALS. (Schneekristalle; Text in German). p.49-51 incl. illus. diagrs. (In: Mikrokosmos-Jahrbuch 1925-26).10 refs.
SIPRE files, S-984

According to Hellman's classification there are 2 main types of snow crystals based on the development of the crystal axes. About 80% of all snow crystals are plates with prevalent development of the secondary axes and a reduced main axis. Column-shaped crystals include prisms, pyramids and column-star or column- plate combinations with equally developed main and secondary axes. The influence of electricity, air temperature and winds on the modification of snow crystal shape and size are mentioned. The importance of photography for the study of snow crystals and the techniques of snow crystal photography and microphotography are discussed.

SIP U5744

Nikolaev, N. G.
OPENING AND FREEZING OF THE LAKES. (Vskrytie i zamerzanie ozer; Text in Russian). Spravochnik po vodnym resursam, 5:505-513 incl. tables, 1934.
DLC, GB746.S75, v. 5

Numerous lakes of the Lower Volga region are characterized by a variety of winter processes. Development of the processes in lakes with fresh water depends on their geographical location. The lakes located north of 50°N. lat. are covered by ice from Oct. to mid-April; the southern lakes, from Nov. to mid-March. The mean duration of the ice cover is about 175 days in the Kazan'-Kuybyshev region, 150 days in the Saratov-Ural'sk area, and 125 days in regions near Stalingrad.

SIP U5745

Nikolaev, N. G.
ICE COVER AND ANCHOR ICE IN THE RIVERS. (Ledovyĭ pokrov i donnyĭ led na rekakh; Text in Russian). Spravochnik po vodnym resursam, 5:494-505 incl. tables, graphs, diagrs. 1934. 2 refs.
DLC, GB746.S75, v. 5

The extensive area (over 1000 km.) of the Lower Volga region is subject to wide differences in ice thickness on the rivers. The region is divided into 2 zones by the 49°N. lat.: the northern zone where river ice attains thicknesses of 50-70 cm. and greater; and the southern zone where the ice is less than 50 cm. thick. The most intensive ice formation in the Volga occurs at the beginning of winter, when ice grows at a rate of 10-18 cm./day. The

formation of ice layers 30-50 cm. thick limits water cooling and ice growth. Only small increases of ice thickness occur during the second half of winter. Irregular observations of anchor ice indicated the possibility of its occurrence everywhere.

SIP U5746

Nikolaev, N. G.
ICE THICKNESS IN THE LAKES. (Tolshchina l'da na ozerakh; Text in Russian). Spravochnik po vodnym resursam, 5:513-514 incl. table, map, 1934.
DLC, GB746.S75, v. 5

The mean thickness of the ice cover of lakes in the Lower Volga region ranged from more than 50 cm. in the north to less than 25 cm. in the south. Differing salt content caused wide variations in freezing dates of salt lakes. Many lakes of high salt concentration remain ice-free throughout the winter. The formation of a snow cover over ice-free water surfaces was observed in some salt lakes.

SIP U5747

Sokolova, T. N.
SOIL FREEZING. (Promerzanie pochvy; Text in Russian). Spravochnik po vodnym resursam, 5:515-519 incl. tables, 1934.
DLC, GB746.S75, v. 5

Soil temperature was measured in the Lower Volga region to depths of 150-200 cm. at several places over a period of 6-25 yr. Tables indicate that the soil surface was frozen from Oct.-March in the south and Oct.-April in the north. Mean duration of temperatures below the f.p. at a depth of 10 cm. varied from 157 days in the north to 95 days near the coast of the Caspian Sea. Temperatures below the f.p. at a depth of 50 cm. were observed an average of 118 days near Boguruslan (north) to 22 days near the Caspian Sea. Maximum soil freezing was observed at Nikolaevskaîa to a depth of 218 cm., and in Stalingrad to a depth of 200 cm. Frost penetrated only to 154 cm. at Kamyshin located between Nikolaevskaîa and Stalingrad due to the influence of forests and a deeper snow cover.

SIP U5748

Chernigovskiĭ, N. T.
TENTATIVE DETERMINATION OF THE RADIATION BALANCE OF THE KARA SEA. (Opyt opredeleniîa radiatsionnogo balansa Karskogo morîa; Text in Russian). Problemy Arktiki, No. 3:92-97 incl. tables, graph, 1940. 7 refs.
DLC, G600.P7, 1940

Observations made during 1936-1938 in the Kara Sea region were used to calculate the heat balance. The monthly mean albedo value of the snow cover was 87-90% in winter and 84% at the beginning of snow melting. The albedo of ice ranged from 40% in winter to 46-50% in May. Observations in 1938 at Cape Chelyuskin showed a decrease of snow cover albedo from 87-86% in April-May to 78% in June-65% in July during snow melting.

SIP U5749

Ponomarev, V. M.
MORE ON THE HYDROGEOLOGICAL CONDITIONS OF RAZDELNYI PENINSULA (VAIGACH ISLAND) AND AMDERMA. (Eshche raz o gidrogeologicheskikh usloviîakh poluostrova Razdel'nogo (ostrov Vaĭgach) i Amdermy; Text in Russian). Problemy Arktiki, No. 4:81-91 incl. graphs, map, diagrs. 1940. 3 refs.
DLC, G600.P7, 1940

P. V. Vittenburg's The Thermal Regime and Underground Waters in the Permafrost of Vaigach Island and Amderma is critically discussed. Vittenburg's claims that permafrost reaches a thickness greater than 500 m. and that no permafrost exists under the sea bottom do not agree with observations. Insufficient exploration of the thermal soil regime in the Razdelnyi peninsula make it impossible to determine the permafrost thickness. Permanent negative temperatures under the Varnek Bay were observed and led to the conclusion about the presence of permafrost under the sea bottom. (See also SIP U2127)

SIP U5750

Bydin, F. I.
WINTER REGIME OF THE RIVERS AND THE METHODS OF STUDY. (Zimniĭ rezhim rek i metody ego izucheniîa; Text in Russian with French summary). Issledovaniîa rek SSSR, Gosudarstvennyi Gidrologicheskiĭ Institut, 5:5-237 incl. illus. tables, graphs, diagrs. 1933. 113 refs.
DLC, TC1.L342, v. 5

A study of winter processes in rivers, summarizing the investigations made in and outside of the USSR is presented. Winter temperatures, precipitation, evaporation, moisture migration in soil and their interrelations with the river regime are analyzed and discussed. Ice conditions and run-off variations are included. Data of density, thermal conductivity, heat capacity, plasticity and other constants of ice and snow obtained since 1762 both in and out of the USSR are summarized and discussed. It is shown that a high thermal conductivity of the soil, considerable soil moisture, and significant wind speed favored intensive anchor-ice formation, which was observed throughout the USSR. Islands of anchor ice called pyatry extend from the bottom to the surface of the Kanoma, Narov, and Volkhov rivers. These formations often reach heights of 1 km. and more, and are always formed above stony beds of rivers, increasing in size with river flow speed.

SIP U5751

Zubov, N. N.
THE NORMAL THICKNESS OF BROKEN COASTAL ICE. (O normal'noĭ tolshchine morskikh l'dov v raĭonakh ikh vynosa; Text in Russian). Problemy Arktiki, No. 5:43-45 incl. graph, 1939. 1 ref.
DLC, G600.P7, 1939

A formula based on theory and observations at Uedinenie Island and Shmidt Cape during 1935-37 is suggested. The ice thickness is calculated from air temperatures. The calculated results are in good agreement with data presented by Weiprecht, Karelin, and Dralkin for other parts of the Arctic Sea. The probable increase of ice thickness is indicated graphically for a case, when the difference between air and water temperatures is 25°C and the speed of ice motion is equal to 1 mi./day, the average rate in this region. The ice thickness under these circumstances will be about 110 cm. after 80 days and about 150 cm. after 150 days.

SIP U5752

Zubov, N. N.
THE INDEX OF SEA FREEZING. (O pokazatele zamerzaniía morîa; Text in Russian). Problemy Arktiki, No. 4:5-12 incl. tables, graphs, diagr. 1939. 3 refs.
DLC, G600.P7, 1939

A simplified method of calculations, based on the following proposition is recommended for the study of ice formation processes. Vertical winter circulation occurs within depths of uniform density and salinity and even distribution of freezing temperatures. Observational data in the Bering and Kara Seas are used for tentative calculations.

SIP U5753

Mothes, H. and B. Brockamp
SEISMIC INVESTIGATIONS ON THE PASTERZENKEES, GLOCKNER GROUP, EASTERN ALPS. (Seismische Untersuchungen am Pasterzenkees, Glocknergruppe, Ostalpen; Text in German). Z. Gletscherkunde, 19:1-17 incl. tables, graphs, diagrs. April 1931. 9 refs.
DLC, QE575.Z4, v. 19

The investigations were conducted to determine the glacier depth in determined places of the basin and to collect material for the study of wave propagation. Seven parallel longitudinal soundings were made at distances of 50-60 m. by detonating explosives on the ice surface. The following waves were measured: longitudinal waves at 3580 m./sec., transverse waves at 1670 m./sec., longitudinal waves passing through the bedrock at 5850 m./sec., longitudinal and transverse waves originating from the lower boundary of the ice, and reflected longitudinal waves. Equations are presented for calculating the ice depth from the time required for waves at rectangular and oblique angles of wave incidence to reach the receiving stations. The average thickness of the glacier profile was calculated to be about 300 m. Geometric-optical methods for the depth determination of sharply inclined boundaries are described. Longitudinal and transverse profiles constructed from the seismic values are graphically presented.

SIP U5754

Vardanîanz, L.
A NEW METHOD OF CALCULATING THE DEPRESSION OF THE SNOW LIMIT APPLIED TO OLD GLACIER LEVELS IN THE UPPER BASIN OF THE ARDON, CENTRAL CAUCASUS. (Über eine neue Methode zur Berechnung der Depression der Schneegrenze, angewendet auf alte Gletscherstände im oberen Einzugsgebiet des Ardon, Zentraler Kaukasus; Text in German). Z. Gletscherkunde, 19:104-124 incl. tables, diagrs. April 1931. 5 refs.
DLC, QE575.Z4, v. 19

L. Kurovski's method for calculating the depression of the snow line cannot be applied to the Caucasian glaciers due to inaccurate topographic maps. A formula is developed through which the depression of the snow line may be determined from the median heights of individual glacier sections. Snow-line depressions are calculated for the Zanguchi, Bubu-don, Saramag, Arnag, Zchubichi and Korgan glaciers and the results are compared with older data. Glacier retreat is attributed to increased melting and decreased snow precipitation. (See also SIP U4505)

SIP U5755

Brandt, B.
CRYOCONITE IN THE MAGDALENA BAY IN SPITSBERGEN. (Über Kryokonit in der Magdalenenbucht in Spitzbergen; Text in German). Z. Gletscherkunde, 19:125-126, April 1931. (Notes) 4 refs.
DLC, QE575.Z4, v. 19

Numerous groups and rows of cryoconite holes, 2-3 m. apart, were observed on the Gully Glacier. Some were extremely shallow; others were from 6-16 cm. deep, 1-12 cm. in diam. and cylindrical in shape. Shallow cavities may be old cryoconite holes eroded by ablation, or new holes formed by recent dust deposits which have retarded melting. Thin, fresh dust layers observed at the glacier edge may be due to landslides.

SIP U5756

Elton, Charles S.
THE NATURE AND ORIGIN OF SOIL-POLYGONS IN SPITSBERGEN. Quart. J. Geol. Soc. London, 83:163-194 incl. illus. table, diagrs. discussion, April 23, 1927. 13 refs.
DLC, QE1.G4, v. 83

Results of observations and excavations of arctic soil polygons made in 1924 on Reindeer Peninsula (northern Spitsbergen) are presented. Mud polygons are fissured mud domes containing few or no stones. The upthrust of the soil is produced by frost action in winter, and the cracks are due to drying in summer. Stone polygons consist of stone-enclosed mud centers, regular in size and spacing. A new hypothesis explaining the regular distribution and differential arrangement of stone polygons is presented. Differential frost splitting occurs along a vertical direction, bringing stones to the top and leaving the

mud below to develop into mud polygons. As the layer of stones becomes thinner, the mud centers reach the surface, push outward upon freezing, and thrust the stones before them. The stones form a stone border or ring. Separate rings meet to form a network of stone polygons.

SIP U5757

Dobrowolski, A.
NOTES ON THE SHAPE AND STRUCTURE OF SNOW CRYSTALS. (Quelques idées sur la forme et sur la structure des cristaux de neige; Text in French). Ciel et Terre, 24:391-403, 427-438, 449-459, illus. Nov. 1903. [14] refs.
DLC, QB1.C5, v. 24

Several debatable problems are discussed: the existence of 2 crystallization systems or 1 hexagonal system, the amorphous or crystalline character of snow, and the simple or aggregate state of snow and hoarfrost specimens. Snow crystal formations are aggregates, remnants, or deformations of the 3 basic crystal forms: plate, wider than high; columnar, higher than wide; and an intermediate form developed equally along 3 axes. All snow crystals form at the expense of equal amounts of water vapor, making surface crystals very large, and linear crystals very long. The growth of snow crystals, the formation of aggregates, and the origin of internal cavities are discussed. A theory is presented proposing that the diversity of snow crystals is limited and is based on combinations of elements of limited variety. Structural analogies between hoarfrost and clouds are considered.

SIP U5758

Prinz, W.
ICE FLOWERS. (Fleurs de glace; Text in French). Ciel et Terre, 6:499-510, illus. 1895. 5 refs.
DLC, QB1.C5, v. 6

Fog, rain, snow, and hail are relatively sudden phenomena resulting from meteorological disturbances. Dew and hoarfrost occur on calm nights when moist air-layers in contact with colder objects deposit moisture. Dew is deposited at relatively high and hoarfrost at low temperatures. Hoarfrost is a crystallized form of dew, due to the sublimation of water vapor. The study of hoarfrost indicates 2 basic crystal formations, the funnel and the columnar type crystal. The columnar type grows rapidly, is associated with a higher humidity and temperature than the funnel type, prevails at the beginning of the cold season, and persists later in sheltered ravines and along streams. The funnel type crystal occurs in relatively high and dry places, and replaces the columnar type as winter weather proceeds. The transition from one type to the other with changes in humidity and temperature is described and illustrated.

SIP U5759

[Bucher, Edwin]
SNOW-BOY TECHNICAL DATA. (Snow-Boy technische Daten; Text in German). 2p. illus. [n.d.]
SIPRE files, S-1051

The automatic miniature snowplow with cutter and blower is driven by a 9-10 hp. gasoline motor. The motor, coupling, chassis and gears are described. The interchangeable, vertical cutters consist of 8 blades mounted on broadly flanged spokes. Snow can be discharged from either side. The machine has 6 propulsion, 2 reverse, and 4 rotation speeds, a normal casting width of 10-15 m. at an angle of 55° and a removal capacity of 300-400 cu.m./hr.

SIP U5760

Bucher, Edwin
SNOWBOY, THE MINIATURE SNOWPLOW. 6p. incl. illus. table, [n.d.]
SIPRE files, S-1051

The Snow Boy is a small-sized rotary snow clearing device (weight, 831 lb.) primarily used to supplant manual labor as well as conventional snow removal from roads and streets. Snow Boy's loading chute can fill a 5-ton truck in 5 min., and its blower can displace snow about 40 ft. Three Snow Boys operating as an echelon can clear a path 8 ft. wide. The milling blades and the snow caster are assigned to independent machine elements, which may run at different speeds. The general specifications for Snow Boy, Model 2003, are given. (See also SIP U5759)

SIP U5761

[Bucher, E.]
SNOW-BOY, THE SMALL-SIZED SNOWPLOW OF GREAT CAPACITY. (Snow-Boy, der kleine Schneeramer mit der grossen Leistung; Text in German). Snow-Boy A. G. 14p. [n.d.] (typed ms.)
SIPRE files, S-1051 (a)

The cutter blades and the rotary ejector are driven by separate machine elements and may work at different, coordinated speeds. The machine has a cutting width of 2.70 ft., a clearing capacity of 300 cu. m./hr. and a casting width of 10-15 m. A loading mechanism may place 5 tons of compressed snow on trucks within 7 min. Small size, light weight and climbing capacity permit diversified uses. The technical data of the machine are presented. Instructions are given for using the plow on roads, as a loader on streets, on airfields and in winter warfare. (See also SIP U5759, U5760)

SIP U5762

Finlay, Walter L.
PLAIN WATER'S UNPLAINNESS. Sci. American, 165:142-144 incl. illus. graph, diagrs. Sept. 1941.
DLC, T1.S5, v. 165

The supercooling of water, the formation of Tyndall's ice flowers and the allotropic forms of ice are discussed. A phase diagram of water indicates the respective pressure and temperature conditions under which each of 6 stable forms of ice exists. Ice-I (ordinary ice) occurs at pressures below 2000 atm., ice-VII does not occur at temperatures below 179°F, ice-IV is unstable, ice-II and III occur at temperatures below 0°C and ice-V and VI at temperatures above 0°C.

SIP U5763

Lugeon, Jean
FROST-FREE ANEMOMETER OF THE 2500-M. HIGH SAENTIS OBSERVATORY. (L'anémomètre anti-givre de l'observatoire du Saentis à 2500 m; Text in French). Bull. Tech. Suisse Romande, 79: 127-132 incl. illus. graphs, diagrs. May 16, 1953. 3 refs.
DLC, TA4.B8, v. 79

A heated anemometer is described which functions satisfactorily at temperatures of -15°C and wind speeds of 150 km./hr. at 2500-m. elevation. Heat is provided by radiation of a fixed electrical resistance coil concentric to the rotating axis of the rotor. An estimated 1-2 kw. proved satisfactory to defrost the anemometer under excessive moisture conditions between -4° and -12°C at wind speeds of 150 km./hr. An unheated anemometer blocked by ice is free to turn again 3-4 min. after turning on the current. Manual switches control the wattage used. A total of 250-340 w. are used with moderate winds, 500-680 w. with wind speeds of 50-100 km./hr., and 1000-1400 w. with wind speeds over 150 km./hr. The average annual electric consumption to operate the anemometer is about 3200 kw.-hr.

SIP U5764

Featherstonhaugh, Duane
[SNOW RINGS]. Natural History, 49:67 incl. illus. Feb. 1942.
DLC, QH1.N13, v. 49

Two methods of formation of snow rings, found at the bottom of a fairly steep slope, are suggested. The rings are snowballs formed about a stone which sank through the snow to the ground during warm spring weather. The snow became crusty through alternate freezing and thawing, the crust sprang outward at the top of the slope, the snow softened sufficiently during the next warm spell to roll down the hill like a hoop. The paths followed and the lines of their formation are visible in accompanying photographs.

SIP U5765

Keil, K.
FROST DAMAGE DANGER IN ROAD CONSTRUCTION. (Die Frostschädengefahr im Strassenbau; Text in German). Strassen- u. Tiefbau, 3:382-386 incl. illus. diagrs. Dec. 1949. 6 refs.
DLC, Unbound periodical

Frost damage to roads is the result of a frost-susceptible subgrade, excess of water within the frost-susceptible zone, and climatic conditions. Mixed loam and clay soils containing 3% or more of grains smaller than 0.02 mm. in diam. and homogeneous soils containing 10% or more of such grains are frost susceptible. Soils having a grain size of 0.06 mm. or more are frost resistant. Frost-susceptible and- resistant rocks are listed. The various ground-water conditions are analyzed and correlated with frost damages. Frost heaving and spring break-up are discussed. Frost damage prevention includes water drainage from the frost-susceptible soil layer, and construction of a protective layer of frost-resistant material under the road surface for drainage of the percolating water. Insulating layers are considered ineffective. Instructions for placing a frost-protective layer are included.

SIP U5766

Obruchev, V. A.
DEVELOPMENTAL TRENDS OF PERMAFROSTOLOGY IN THE USSR. (Puti razvitiâ merzlotovedeniâ v SSSR; Text in Russian with English summary). Izvestiâ Akademii Nauk SSSR, Seriâ Geologicheskaâ, No. 3:34-44, 1945. 40 refs.
DLC, AS262.A62465, 1945

The contributions by the Igarka, Yakutsk, Anadyr and Vorkuta permafrost stations and results of 6 permafrost conferences up to 1941 are discussed. Investigations were extended to the study of ice deposits and artesian wells in Yakutsk (200 m. deep), and of mining constructions in Vorkuta. The permafrostology commission and committee was reorganized into the Obruchev Institute of Permafrostology. Solutions of the main problems of permafrost, origin, its degradation, cartography of permafrost regions, determination of permafrost thickness, and systematic analysis of observational data were undertaken by the Moscow laboratory. Processes accompanying freezing and thawing, polygonal structures, and in engineering permafrost are emphasized.

SIP U5767

Koloskov, P. I.
CLIMATIC DESCRIPTION OF KOREA. (Klimaticheskoe opisanie Korei; Text in Russian). Redaktsionno-izdatel'skiĭ Otdel Gidrometsluzhby, Moscow-Leningrad, 1936, 47p. incl. tables, maps, diagrs. 5 refs.
DLC, QC990.K8K6, 1936

Climatic data obtained from 15 stations are tabulated and discussed. The low amount of winter precipitation produces a scant snow cover, which is stable only in the northern part of Korea. The mean duration of the snow cover varied from 100 days in the south to 190 days in the north. The snow cover reappeared during April in the south and in May in the north in certain years. The mean number of days with snowfall varied from 6.6 days in the south (Pusan) to 73.4 days in the north (Tiukotin). Snowfalls are more frequent during Jan.-Feb.

SIP U5768

Nekrasov, P. I.
CLIMATE OF NON-CHERNOZEM AREA. (Klimat nechernozemnoĭ polosy; Text in Russian). Moscow, 1937, 40p. incl. tables.
DLC, QC989.R49N4, 1937

Air temperature, precipitation and snow cover data from 45 stations are tabulated and discussed. The non-chernozem area of European USSR is located north of 52°-53°N. lat. The northern tundra zone, which borders on the White and Barents Seas, is characterized by long, severe winters with violent snowstorms, relatively scant precipitation, and permafrost. The forest zone has cold winters and cool summers in the eastern part, mild winters with considerable precipitation in the west. The southern forest-steppe zone has a moderately cold winter, warm summer and considerable precipitation. Snow covers the tundra zone for an average of 260-280 days. A stable snow cover forms in forest and forest-steppe zones during Oct.-Nov. The mean maximum snow depth attains values up to 50-80 cm. in the forest zone, 40-50 cm. in the northeast of the forest-steppe zone and 15-40 cm. in other parts. Snow melting is usually completed during April-May. Average winter frost penetration in forest and forest-steppe zones did not exceed 70-100 cm. with a maximum up to 130-150 cm.

SIP U5769

Tropp, Wilhelm
EFFECTIVE VALUES OF PAVEMENT MATERIALS TO SECURE RELATIVE FROST PROTECTION. (Die Nutzungswerte der Deckenbaustoffe zur Beurteilung der relativen Frostsicherung; Text in German). Strassen-u. Tiefbau, 3:386-388 incl. table, diagr. Dec. 1949.
DLC, Unbound periodical

Measurements and observations on frost-protected road sections in Essen during the winter of 1939-40 indicated differential heaving in sections with equal road surfaces, soil, and frost conditions. Concrete road surfaces heaved as high as 5 cm., black tops showed negligible heaving and cobble stone pavements heaved 1 cm. The heat conductivity values for the various materials are graphically presented. An equation is established relating the heat conductivity coefficients of the materials used in the road profile and deriving the relative frost-protective values. A comparison of the frost-protection coefficients of 4 road types with either sand or cinder and ash protective layers indicates that a cinder or ash layer, 40 cm. thick, offers the same amount of protection as a 60-cm. sand layer. The evaluation of all road profiles indicated that the depth of frost protection was less than that of frost penetration during the winter of 1939-40 (0.75-0.80 m.) where protective sand layers were used; frost protection was equal to or greater than the maximum frost penetration for roads with layers of cinders or ashes. The computed results are in agreement with observations and measurements.

SIP U5770

Corps of Engineers, St. Paul District
DRAFT; REPORT ON ACCELERATED TRAFFIC TESTS, FAIRBANKS, ALASKA, 1951. 65p. illus. tables, graphs, diagrs. appendices A-C, March 1952.
SIPRE files, S-1055

Tests were conducted at the Field Research Area, Fairbanks (Alaska) to establish design criteria for pavements constructed in permafrost areas and to determine whether existing frost design curves are applicable to pavements on frost-susceptible subgrades in regions of seasonal frost. Varying loads were applied to 2 rigid and 4 flexible surface sections and to 1 section surfaced with a steel landing mat, all underlain by frost-susceptible silt soil containing sand seams and peat lenses. Pavement performances and subgrade deformations were measured and plate bearing, penetrometer and soil tests were made. Test results are analyzed and discussed, and conclusions drawn on the performance of runways several years after construction. Additional tests are planned to obtain construction data for regions without a residual thaw zone. Recommendations include testing of various subsoils containing permafrost, measuring free water in the subgrade, investigating permafrost degradation immediately after completing construction and evaluating the effects of immediate maximum and gradually increasing load application.

SIP U5771

TSvetkov, M. I.
SNOW COVER INFLUENCE ON WINTER CROPS. (Vliîanie snegovogo pokrova na perezimovku ozimykh kul'tur; Text in Russian). Sovetskaîa Agronomiîa, 11, No. 1:79-80, 1953. 1 ref.
DLC, S13.S88, v. 11

The investigations of the Altai Agricultural Institute indicated that snow retention methods, such as snow fences, snowbank, snowplowing, do not prevent the freezing of winter crops in Siberia because the depth of the snow cover is uneven. The most effective results were obtained by sowing sunflower or lucerne with false flax around the winter crop field. These measures, by inducing an even distribution of snow, considerably modified the thermal regime of the soil. The soil temperature near the surface of treated fields did not drop lower than -10°C as compared with temperatures of -25°C in untreated fields. Frost penetrated to a maximum depth of 60 cm. in treated fields, and 150-200 cm. in untreated areas.

SIP U5772

Tverskaîa, N. P.
TEMPERATURE OF THE EVAPORATING DROPLETS. (Temperatura isparîaîushchikhsîa kapel'; Text in Russian). Izvestiîa Akademii Nauk SSSR, Seriîa Geograficheskaîa i Geofizicheskaîa, 15:74-81 incl. tables, graph, 1951. 4 refs.
DLC, AS262.A6246, v. 15

The temperatures of supercooled liquid, or frozen water droplets 0.05 - 0.075 cm. in size, were measured in a laboratory at air speeds of 0-3 m./sec. Thermocouples connected to reflecting galvanometers were used to measure these temperatures. The results indicate the fallacy of the theory that the evaporation temperature of droplets equals the environmental temperature. It was determined that the evaporation temperature is equal to the temperature of the wet bulb thermometer at air speeds of 2.5-3 m./sec. The evaporation temperature of droplets in still air varied according to the size of the experimental chamber and conditions of air convection. A nomogram for determining droplet temperature under different environmental conditions is presented.

SIP U5773

McDonald, James E.
HOMOGENEOUS NUCLEATION OF SUPERCOOLED WATER DROPS. p.1-52 incl. tables, graphs. (In: Final Rept. Theoretical Cloud Physics Studies, Dept. Physics, Iowa State College, Jan. 31, 1953). [15] refs. (Proj. NR 082 093)
DWB, M74.1 I64t

The theory of homogeneous nucleation is advanced to explain the observed crystallization of supercooled water near -40°C. Previous estimates of the specific surface-free energy of a water-ice interface are refined. Mason underestimated the nucleation efficiency by neglecting the distortion energy of the surface layer of ice. Direct calculation of the distortion energy for ice is difficult, but a crude correction for distortion effects leads to a theoretically predicted temperature of -26°C for the threshold of spontaneous nucleation. It is concluded that this theoretical value is sufficiently close to the observed -40°C transition temperature to strengthen the belief that the -40°C transition is due to homogeneous nucleation. (Author's abstract)

SIP U5774

Cumming, W. A.
THE DIELECTRIC PROPERTIES OF ICE AND SNOW AT 3.2 CENTIMETERS. J. Applied Physics, 23:768-773 incl. illus. graphs, diagrs. July 1952. 5 refs.
DLC, QC1.J83, v. 23

The permittivity and loss tangent of ice and snow were measured and the reflection coefficient of snow-covered surfaces was studied at a wave length of 3.2 cm. Permittivity is constant in the 0° to -20°C temperature range. Measurements of guide wave-length as a function of snow density were carried out at a fixed temperature of -18°C to obtain experimental values of permittivity as a function of density. The variation of the loss tangent of snow with temperature from 0° to -18°C and with free water content of wet snow was measured for snows varying in density from 0.34-0.916. The presence of 0.8% free water increases the loss tangent by a factor of 10. Theoretical values of the reflection coefficients of snow-covered surfaces calculated from the permittivity and loss tangent data are compared with those obtained from the direct measurements of reflection from natural snow surfaces. A good agreement is apparent for wet snow. The effect due to multiple reflection of dry snow was not as large as was expected from the values of loss tangent.

SIP U5775

Labrum, N. R.
SOME EXPERIMENTS ON CENTIMETER-WAVE-LENGTH SCATTERING BY SMALL OBSTACLES. J. Applied Physics, 23:1320-1323 incl. graphs, diagrs. Dec. 1952. 6 refs.
DLC, QC1.J83, v. 23

The scattering of electromagnetic waves by small obstacles was measured to interpret radar echoes from rain and cloud formations. The measurements were made at a frequency of 3000 mc./sec. by an impedance-bridge technique, the specimens being contained in a wave guide. The results verify the theoretical relationship between the size of the scatterer and the intensity of the backscattered wave. The variation in scattering during the melting of an obstacle initially composed of ice was observed. The condition of large-scale meteorological phenomena could not be simulated exactly, but the experiments demonstrate qualitatively that the power backscattered from an initially non-spherical ice particle passes through a maximum value during the transition to a water drop. (Author's abstract)

SIP U5776

Labrum, N. R.
THE SCATTERING OF RADIO WAVES BY METEOROLOGICAL PARTICLES. J. Applied Physics, 23:1324-1330 incl. graphs, diagrs. Dec. 1952. 14 refs.
DLC, QC1.J83, v. 23

The scattering of electromagnetic waves by clouds of small spheroidal obstacles is considered from a theoretical standpoint. Numerical data are obtained for clouds composed of partly melted ice particles. These results are applied to the interpretation of bright band radar echoes from meteorological formations. These echoes may contain a component with polarization at right angles to that of the transmitted beam. It is suggested that this property could be utilized in certain cases to provide additional information as to the nature of the scattering particles. (Author's abstract)

SIP U5777

Oppermann
FRONT EXPERIENCES ON ICE FORMATION. Transl. by F. Rizzo. Development Group on Ice Formation Rept. No. 6, 5p. July 24, 1950. (Transl. No. 386)
SIPRE files, S-1040

Aircraft icing experiences encountered at the Russia war front in the fall of 1942 by the German Luftwaffe are evaluated. The collected information indicates that ice formation depends primarily on the prevailing meteorological conditions of the localities. Ground formations have secondary effects. Ice formation is rarest over arid flat land and high hills near the coast under similar weather conditions. Icing occurs from 0-7000 m. altitude in clouds and supercooled rain, and is assumed to be most severe at temperatures from +2° to -15°C. Tabulated data are referred to but not included in the translation.

SIP U5778

Victor, Paul E.
THE FRENCH EXPEDITION TO GREENLAND, 1948. Arctic; J. Arctic Inst. N. Am. 2:135-148 incl. illus. maps, Dec. 1949.
DLC, G600.A695, v. 2

The basic task of the preliminary expedition was to bring heavy equipment of the main expedition to the Ice Cap and to familiarize the members of the main expedition with the region. The landing operations in front of the Eqip Sermia Glacier (69°46'N. lat. 50°15'W. long.) are described. A total of 90 tons of equipment was unloaded. Four camps connected by marked trails were established between the coast and the Central Ice Cap Station (70°54'N. lat. 40°42'W. long.). A cable-way for transporting heavy equipment over a 500-ft. cliff was built between Camp II and Camp III.

SIP U5779

Sandström, Arne Eld
ON THE CONCENTRATION OF HEAVY WATER IN GLACIER ICE. Arkiv Fysik, 3:549-556 incl. illus. tables, diagr. 1952. 4 refs.
DLC, Unbound periodical

Experiments were conducted to determine whether the high concentration of heavy water found in the ice of big Swiss glaciers was also to be found in the small glaciers of the North Scandinavian mountain range. Water drops of the ice sample studied are introduced as floating bodies into a mixture of oils and their position compared with that of ordinary water drops and drops of water and deuterium oxide of known density. The experimental technique used to evaluate the excess of heavy water in per cent of the total sample is described. This excess varies between 0.02 and 0.10%. The values obtained for individual samples are tabulated and show that content of heavy water varies from one part of the bulk ice to another. Swedish glaciers carry a surplus of heavy water which can be as high as 0.05% of the total bulk. No conclusions can be drawn as to where the enrichment actually takes place, though some measurements are at variance with the Eucken and Schäfer thermodynamical theory of the enrichment during the melting process.

SIP U5780

Lagemann, R. T., L. W. Gilley and E. G. McLeroy
THE ULTRASONIC VELOCITY, DENSITY, AND COMPRESSIBILITY OF SUPERCOOLED H_2O AND D_2O. J. Chem. Phys. 21:819-821 incl. table, graphs, May 1953. 12 refs.
DLC, QD1.J94, v. 21

The velocity of compressional waves in liquid water (H_2O and D_2O) was measured over a range of temperature extending to some 6° below the nominal f.p. using a fixed-frequency variable path sonic interferometer. The density of heavy water in the supercooled state was determined and values of the adiabatic compressibility were calculated. The curves representing the variation of density with temperature are symmetrical and congruent for the 2 isotopic liquids. It is confirmed that the compressibility of D_2O is greater than that for ordinary water. The new measurements of the 3 properties yield values which fall on smooth extrapolations of the previously known data, indicating that there is no partial ordering of the liquid structure into the solid structure at temperatures below the nominal f.p., at least none at times removed from the start of observed freezing. (Authors' abstract)

SIP U5781

Dobrowolski, A.
SNOW AND HOARFROST. (La neige et le givre; Text in French). p.4-78 incl. illus. (In: Belgium. Commission de la Belgica. Expédition antarctique belge, Anvers 1903. Météorologie, [v. 3-4])
DLC, Q115.B43, v. 3-4

The shape and structure of the 2 principal forms of simple snowflakes are described. The main axis is very short compared to the secondary axes in plate type snowflakes. The main axis is usually longer, but occasionally slightly shorter than the secondary axes in column type snowflakes. The plate type predominates in frequency, and is characterized by an extreme diversity of shapes. The column type includes 2 principal classes, the prismatic and the needle type. The occurrence and structure of flour-like snow prevailing in very cold weather is presented. Surface hoar and its sublimation on the falling snowflake is discussed. Large compound flakes consisting of aggregates of simple snowflakes may show a regular or irregular formation pattern. Results of observations relating the shape, structure, and dimension of snow crystals to the observed prevailing temperature are presented. Horizontal and vertical growth of surface hoar is discussed.

SIP U5782

Christensen, A. R.
FROST EFFECTS. (Frostens virkninger; Text in Danish). p.385-415 incl. illus. table, graphs, diagrs. (In: Veje og gader, by A. R. Christensen, Copenhagen, G. E. C. Gad, 1948). 24 refs.
DLC, TE145.C47, 1948

Frost penetration in Denmark usually attains depths

of 0.7-0.8 m. and may exceed 1.25 m. in severe winters. Frost heaves of 30 cm. occur. Soil samples with a uniform moisture content of 31.6% were exposed to surface freezing for 24 hr. The moisture content increased to 46% in the upper layers and to 29.6% in the lower ones. The hygroscopic state of frost-susceptible soils is assumed to range from 0.4-5%. Theoretical principles of frost prevention are discussed. The influence of ground water and snow covers of various thicknesses on frost penetration is graphically presented. A formula for the determination of safe depths for laying water pipes is given. The extent of snow fence usage in Denmark is indicated.

SIP U5783

Sweden. Lantförsvarets Kommandoexpedition
HANDBOOK FOR FIELD SERVICE DURING WINTER CONDITIONS. (Handledning för tjänsten i fält under vinterförhållanden; Text in Swedish). Stockholm, Lantförsvarets Kommandoexpeditions Bokdetalj, 1934. 245p. incl. illus. tables, graphs, maps, diagrs.
DLC, U167.5.W5S85, 1934

Instructions concerning military equipment and its care, sanitation, commissary service, and special instructions for marching, camping, and combat under winter conditions are presented. The number of days with temperatures below -10°C for various parts of Sweden are tabulated. Temperatures between -25° to -40°C and with variations of as much as 30° in 12-24 hr. are found in upper Norrland from Jan.-Feb. The snow cover thickness varies from 10-150 cm. during Nov.-March, but rarely exceeds 80 cm. along the coast. Dates of ice formation and break-up for rivers and lakes are given.

SIP U5784

Grönvall, H. M. F.
SIGNAL SERVICE IN SNOW AND COLD. (Signaltjänst i sno och kyla; Text in Swedish). Pansar, Teknik, Underhåll, 16, No. 6:13-14, June 1947.
DLC, U4.P34, v. 16

The effectiveness of military signal service was tested during the winter of 1946-47 in Norrland (Sweden) at temperatures as low as -30°C. A transmitter was operated inside a truck that carried 3 sleds (pulks) on the roof for manual transportation of the station for field use. Extra equipment was carried in a trailer. The cable group used pulks for transportation of cables and wires. The instruments operated well at temperatures down to -20°C in shelters heated by a tent stove. It is concluded that motorized groups equipped with skis and pulks operate more satisfactorily.

SIP U5785

Jaeger, Fritz
FLUCTUATIONS OF THE KILIMANJARO GLACIERS. (Veränderungen der Kilimandjaro-Gletscher; Text in German). Z. Gletscherkunde, 19:285-299 incl. map, Aug. 1931. 16 refs.
DLC, QE575.Z4, v. 19

The changes of the Kibo glacier with respect to fresh snowfall, seasonal fluctuations of the snow cover and firn- and ice-masses are discussed on the basis of literature and photographs published since 1893. The present precipitation at 3000-m. altitude is estimated to be 600 mm./yr. The fresh snow limit is at 3700 m. It is assumed that rime contributes to the glacier accumulation. Melting or direct evaporation caused by solar radiation reduces the snow cover to serrated formation and pillars. The effects of sun and shade exposures are noted in the differential melting of fresh snow and distribution of the snow cover. A steady recession in the firn and ice cover has been taking place since 1887. The ablation area in the crater should be further investigated by direct observation of snowfall and ablation and by examination of the glacier structure. Photographic methods of study of the ice walls are recommended.

SIP U5786

Brandt, B.
CRYOCONITE ON RIVER ICE IN CENTRAL EUROPE. (Kryokonit auf Flusseis in Mitteleuropa; Text in German). Z. Gletscherkunde, 19:317-320, Aug. 1931. 4 refs.
DLC, QE575.Z4, v. 19

Winds distribute street dust over the river ice in narrow wave-like bands. These dust deposits as well as leaves and stones induce a differential thawing rate on the ice cover and result in cavities. Some cryoconite forms contain mud centers similar to the larger polar cryoconite holes.

SIP U5787

Capello, Carlo Felice
FOREIGN GLACIOLOGICAL BIBLIOGRAPHY. II. 1929. (Bibliografia glaciologica estera. II. 1929; Text in Italian). Boll. Comitato Glaciol. Ital. 11: 275-286, 1931.
DLC, QE576.C6, v. 11

The list of about 250 non-Italian references is classified according to: General, European, Asiatic, African, American and Polar glaciology. The entries are arranged alphabetically by author under each heading. The subject content of each reference is indicated by a symbol.

SIP U5788

Bossolasco, Mario
EXPOSURE AS A FACTOR OF THE PHYSICAL CONDITIONS OF GLACIERS. (Il clima di esposizione come fattore delle condizioni fisiche dei ghiacciai; Text in Italian). Z. Gletscherkunde, 19:316-317, Aug. 1931. (Communications)
DLC, QE575.Z4, v. 19

Glacier economy is influenced by climatic factors which are partially controlled by topography of the region. Differential behavior of glacier masses in the same area is frequently due to the effects of exposure to solar radiation, and to lower air streams

determined by the topographic relief. This factor must be considered in comparative ablation measurements of glacier surfaces.

SIP U5789

Weiss, S. J.
USE OF THE SOIL TRUSS MARK 2 IN DETERMINING THE SHEARING STRENGTH CHARACTERISTICS OF A SNOW COVER. Tech. Note N-075, Naval Civil Eng. Res. Evaluation Lab. 5p. illus. tables, graphs, Jan. 23, 1952. (Proj. NY440 007-1). 6 refs.
SIPRE files, S-1032

The soil truss is a portable direct shear apparatus for determining the shearing strength at zero normal loading and the rate at which the shearing strength increases with normal loading. Tests were conducted to determine the applicability of the instrument for measuring the shearing strength and trafficability of snow. Wet old snow was tested in Nov. 1951; settling powder snow in Jan. 1952. Instrumentation, investigative and data reduction techniques are described. Soil truss readings could be taken on mechanically or naturally compacted snow, but not on freshly fallen, light snow. It is concluded that the shearing strength of snow can be classified according to Coulomb's Empirical Law and that the Soil Truss Mark 2 can adequately classify the shearing strength of all but freshly fallen snow.

SIP U5790

Zumberge, James H. and James T. Wilson
QUANTITATIVE STUDIES ON THERMAL EXPANSION AND CONTRACTION OF LAKE ICE. J. Geology, 61:374-383 incl. illus. table, maps, diagrs. July 1953. 14 refs.
DLC, QE1.J8, v. 61

Field observations during the winter of 1951-1952 on Wamplers Lake in southeastern Mich. included measurements on the movement of the sheet of lake ice in response to air-temperature fluctuations. The following generalities resulted from the study. A temperature rise of 1°F/hr. prolonged over a period of 12 hr. on an 8-in. sheet is sufficient to cause thrust on a shore composed of unconsolidated glacial outwash containing some boulders. The direction of ice thrust against the shore is not everywhere orthogonal to the trend of the shore line on an elongated lake but may be oblique at certain points. Tensional fracturing of the ice due to rapid cooling results in one set of cracks that radiate from the central part of the lake and another set roughly concentric with the shore line. (Authors' abstract)

SIP U5791

Simojoki, Heikki
ON RIVER LEVEL RISING IN SPRINGTIME AS CAUSED BY ICE JAMS. Geophysica, 5:1-10 incl. tables, graphs, map, 1952. 5 refs.
DLC, QC801.G38, v. 5

The natural water course of rivers flowing into the Gulf of Bothnia was investigated. Snow melting in spring raises the level of rivers, ice loosens from the river banks and begins to move. The average dates of the beginning and ending of spring break-up are tabulated for 13 locations distributed among 8 rivers. The time between the 2 dates varies from 2-13 days. The time lapse between the average date of the spring isotherm and the average date of the beginning of spring break-up varies from 8-16 days, the corresponding difference for large lakes being about 25 days. An abrupt rise of water level occurs before the beginning of the break-up. Irregularities attributed to ice jams occur during break-up. Regularity in variation resumes after the end of break-up. Two methods of determining the amount of level fluctuation due to ice jamming are presented. A graphic analytical method compares the abrupt deviation of water level fluctuation at one tide pole with the values on a superimposed smooth curve. The other method compares the increase of water level during the same period at 2 points on the river. The first method is satisfactory when abrupt short-duration changes are registered; the second is satisfactory if the jamming occurs at the lower tide pole, but gives excessive values when the jamming occurs at the upper tide pole. Results of estimated amount of jamming by both methods are tabulated. It is estimated that about 20-60% of the maximum water-level rise during spring is due to ice jams.

SIP U5792

Gamaſünov, A. T.
DETERMINATION OF ICE PRESSURE ON BRIDGE SUPPORTS UNDER NATURAL CONDITIONS. (Opredelenie davleniſâ l'da na opory mostov v naturnykh usloviſâkh; Text in Russian). Tekhnika Zheleznykh Dorog, 6, No. 12:24-25 incl. diagrs. 1947.
DLC, TF.M613, v. 6

A device for determining ice pressure on bridge supports is described. Several dynamometers were inserted between a 4-ton metal frame and the bridge support. The fluctuation of pressure with time may be determined. A maximum pressure of 51.2 tons was observed with an ice flow of 2000 sq. m., 30-40 cm. thick, moving about 1 m./sec.

SIP U5793

Holzapfel, Rupert and Gerhard Kirsch
THE SURFACE WAVES OF THE GREENLAND INLAND ICE. (Über die Oberflächenwellen des grönländischen Inlandeises; Text in German). Meteorologische Z. 51:262-264 incl. graph, July 1934. 2 refs.
DLC, QC851.M3, v. 51

Three differing inland ice surface forms are distinguished: sastrugi, a large and irregular undulation which decreases towards the center, and parallel waves. The length of the waves varies from 5-7 km., the amplitude decreases towards the center from about 15-20 m. to about 5 km., and the

direction is normal to the prevailing wind direction. The waves are attributed to the final deposition of snow at high wind speeds during frequent drifts. The intensity regularly changes with wind direction due to a disturbance with a specific critical wave length. The waves are explained mathematically as a function of Reynold's number, a disturbance parameter, flow velocity, and a kinematic coefficient of viscosity.

SIP U5794

Hess, Hans
LEO HANDL'S TEMPERATURE MEASUREMENTS OF ICE AND AIR IN THE ADITS OF THE MARMOLATA GLACIER AND THE GLACIERS OF THE ORTLER AREA 1917-1918. (Leo Handl's Temperatur-Messungen des Eises und der Luft in den Stollen des Marmolata-Gletschers und denen des Ortlergebietes 1917-1918; Text in German). Z. Gletscherkunde, 27:168-171 incl. tables, April 1940.
DLC, QE575.Z4, v. 27

Results of measurements made in 2 adits of the Marmolata Glacier and in several adits of the Ortler area at various periods are presented. Ice temperatures were measured by drilling horizontal holes into the walls of the adits to depths of 30, 45, and 70 cm. Mean ice temperatures ranging from -0.14° to -2.50°C and mean air temperatures in the adit from -0.51° to -3.1°C were observed in the Marmolata adit. The mean ice temperature usually exceeded the air temperature by about 0.5°C. It is concluded that firn and ice temperature conditions must be obtained from bore holes deeper than 70 cm. and with small diam. in order to measure ice uninfluenced by the daily and annual temperature variations.

SIP U5795

Heybrock, Werner
SNOW LIMIT AND FIRN CONDITIONS AT THE GRAN SASSO D'ITALIA (ABRUZZI) IN THE FALL OF 1938. (Schneegrenze und Firnverhältnisse am Gran Sasso d'Italia (Abruzzen) im Herbst 1938; Text in German). Z. Gletscherkunde, 27:171-176, illus. map, April 1940. 2 refs.
DLC, QE575.Z4, v. 27

Observations made in the summer of 1938 indicate a lowering of the mean snow limit from a 2900-3000 m. elevation in 1929 to 2290 m. and 2173 m. in the 2 main valleys of the Abruzzi Alps. Considerable increase in firn accumulation was observed on the Monte Corno Grande Glacier. The glacier surface was furrowed by grooves up to 1 m. deep which are attributed to the erosive action of heavy rains. The firn conditions observed in 1938 may be attributed to an exceptionally cool summer.

SIP U5796

Gvinchidze, N. M.
PREVENTION OF AVALANCHE DAMAGES ON HYDROELECTRIC PLANTS IN MOUNTAINOUS REGIONS. (Bor'ba so snezhnymi lavinami pri vysokogornom gidroenergostroitel'stve; Text in Russian). Gidrotekhnicheskoe Stroitel'stvo, 22, No. 4:42-45 incl. diagr. 1953. 1 ref.
DLC, TC1.G5, v. 22

Heavy snow precipitation is an important factor in the formation of avalanches. Avalanches attain a maximum speed of 50 m./sec., which value is recommended in forecasting avalanche danger. Formulas for calculating avalanche danger and probable impact on constructions are presented. Preventive measures are listed.

SIP U5797

Monterin, Umberto
THE PERIODICAL VARIATIONS OF ITALIAN GLACIERS, 1930. (Le variazioni periodiche dei Ghiacciai Italiani, 1930; Text in Italian). Boll. Comitato Glaciol. Ital. 11:5-24 incl. tables, 1931.
DLC, QE576.C6, v. 11

Data of spring and summer snowfalls on the Monte Rosa Glacier tabulated for 1926-1930 indicate that the date of disappearance of the snow cover is directly dependent upon snow precipitation and the mean temperatures during April and May. Three hundred fifteen glaciers were observed. The condition of 210 of these glaciers are known, of which 166 are receding, 23 advancing and 21 stationary. Glaciers in recession diminished by 15%, advancing glaciers increased by 11% and stationary glaciers increased by 4% as compared with 1929. The cause is attributed primarily to a drop in summer temperatures. Winter and summer precipitation are considered to be secondary factors in glacier variations. The general decrease in the percentage of receding glaciers might initiate a phase inversion or represent a temporary positive variation.

SIP U5798

Capello, Carlo Felice
ITALIAN GLACIOLOGICAL BIBLIOGRAPHY, II. 1929-1930. (Bibliografia glaciologica italiana, II. 1929-1930; Text in Italian). Boll. Comitato Glaciol. Ital. 11:265-274, 1931.
DLC, QE576.C6, v. 11

The list of 154 references published from 1929-1930 is arranged alphabetically by author. Symbols are assigned to each reference indicating the subject content. A regional geographical index is included.

SIP U5799

Mònterin, Umberto
RESEARCH ON ABLATION AND GLACIER RUN-OFF ON THE SOUTHERN SLOPES OF MONTE ROSA. (Ricerche sull'ablazione e sul deflusso glaciale nel versante meridionale del Monte Rosa; Text in Italian). Boll. Comitato Glaciol. Ital. 11: 49-123 incl. illus. tables, graphs, 1931. 19 refs.
DLC, QE576.C6, v. 11

Ablation in relation to elevation was studied from June-Oct. 1930. Values recorded by 5 Ahlmann-Devik ablatometers erected at intervals up to 4560 m. are tabulated and graphically presented. Observations indicate that the vertical thermal gradient increases and the ablation gradient decreases with increasing elevation and decreasing temperature. Ablation variations are greatest in the frontal regions, and diminish with increasing elevation. The glacial run-off exceeded precipitation by 6.9% in 1930. Run-off variations in relation to glacier fluctuations are discussed. Run-off in excess of accumulation was always accompanied by a frontal recession.

SIP U5800

Solomentsev, N. A.
OBSERVATIONS ON ANCHOR ICE. (Nablîudeniîa nad vnutrivodnym(donnym)l'dom; Text in Russian). p.349-350 incl. diagr. (In: Gidrometriîa by N. A. Solomentsev, Leningrad, Gidrometeoizdat, 1950)
DLC, TC175.S65, 1950

A net for measuring and observing anchor ice of a spongy or pasty character and sometimes containing sand, gravel and other particles is described. The device consists of an iron ring, 30 cm. in diam., 5 cm. high, and less than 1 kg. in weight. Cross-pieces of iron strips are fastened to the ring and a metal net is stretched over the pieces. The unit is suspended in the middle by a thin rope. The nets are sunk to the bottom at points of greatest river flow where anchor ice is expected to form, and are removed after 20 hr. The amount of anchor ice formed is obtained from the difference in weight of nets before and after thawing or by measuring the water equivalent of the ice.

SIP U5801

Gamaîunov, A. I.
DETERMINATION OF ICE PRESSURE ON BRIDGE SUPPORTS. (K voprosu ob opredelenii davleniîa l'da na opory mostov; Text in Russian). Tekhnika Zheleznykh Dorog, 6, No. 4:15-17 incl. diagrs. 1947. 8 refs.
DLC, TF4.M613, v. 6

The crushing strength of ice is affected by temperature, the formation process, condition prior to breaking, rate of load increase and location of the sample. The crushing strength varies from 5-127 kg./sq. cm. at 0°C with a norm of 10-20 kg./sq. cm. The increase of crushing strength from 9.7-49.0 kg./sq. cm. at a loading speed of 20 cm./min. and 2 cm./min. at temperatures between 0° and -10°C is tabulated. Ice pressure on bridge supports was studied empirically for 3-4 yr. to determine the calculating techniques for planning safe bridge supports.

SIP U5802

Melkumov, S. M.
DEPTH OF BUILDING FOUNDATION AND FROST PENETRATION. (O glubine zalozheniîa fundamentov zdanii v zavisimosti ot promerzaniîa gruntov; Text in Russian). Tekhnika Zheleznykh Dorog, 6, No. 6:22-23, 1947.
DLC, TF4.M613, v. 6

Gol'dshteĭn's formula for suction pressure of water from lower layers of ground is criticized. The linear relation between the suction force of water and foundation pressure lacks theoretical and experimental proof. The calculated depth for suction force varying from 0.5 to 1.0 kg./sq. cm. is 1.0 to 3.8 m. The formula also neglects the time factor of ice lens formation and filtration coefficient of water migration in the ground. The application of the Gol'dshteĭn formula has led to erroneous results in calculating safe depths for foundations.

SIP U5803

Potapov, M. G.
EFFECTIVE SNOW PROTECTION. (Aktivnaîa snegozashchita; Text in Russian). Tekhnika Zheleznykh Dorog, 6, No. 7:25-27 incl. illus. diagrs. 1947.
DLC, TF4.M613, v. 6

Protection from snowdrifts was accomplished aerodynamically by 1 to 5-m. wide wooden snow fences built up to 2 m. above the ground on poles and inclined 30-45°. The wind is forced down, protecting a surface 6-12 m. wide, depending on the wind velocity. The most effective angle and dimensions of the fence for drifting snow in cuts is illustrated. Inclined fences are satisfactory for low drifts.

SIP U5804

Gol'dshteĭn, M. N.
GROUND AND FOUNDATION HEAVING. (O puchenii gruntov i vypuchivanii fundamentov; Text in Russian). Tekhnika Zheleznykh Dorog, 6, No. 8:21-22 incl. diagrs. 1947. 2 refs.
DLC, TH4.M613, v. 6

Frost heaving is caused by volume increase of water (9%) in ground pores and by water content increase due to capillary rise. The latter is explained by the suction of additional water from below and by the presence of water in bound and free states. Soil particles are assumed to be surrounded by a film of water bound to the particles with varying binding force. Heaving occurs when buffer films are formed between the ice and the soil particles and buffer

pressure is exerted by water penetrating into these films. The value of suction pressure is determined experimentally for each construction area. The formula for calculating this pressure is given and the depth of foundation of low story buildings is calculated accordingly.

SIP U5805

Sumgin, M. I.
ADDITIONAL NOTES ON PERMAFROST IN PEAT MOUNDS ON THE KOLA PENINSULA. (Eshche neskol'ko slov o vechnoĭ merzlote v torfîanykh burgrakh na Kol'skom poluostrove; Text in Russian with English summary). Trudy Komiteta po Vechnoĭ Merzlote, 6:163-165 incl. diagrs. 1938.
DLC, S599.R9A7, v. 6

A mound, 10 m. long, 5 m. wide and 75-100 cm. thick, was stripped of its vegetative cover and part of the unfrozen peat cover. Channels, 1.5 m. wide, were bored to depths 0.3 and 0.6 penetrating the talik completely and to the mid-point. Observations 4 yr. later (1936) indicated that the mid-channel narrowed to 1.20 m., cracks appeared, and the bottom held a 10 to 15-cm. layer of peat. The talik on which the mound rested had deepened to 100 cm. Permafrost in the end-channel had disappeared completely.

SIP U5806

Fedosov, A. E.
A NEW LABORATORY METHOD FOR THE DETERMINATION OF THE VOLUME OF GROUND DURING FREEZING. (Novyĭ metod laboratornogo opredeleniîa ob''ema zamerzaîushchego grunta; Text in Russian with English summary). Trudy Komiteta po Vechnoĭ Merzlote, 6:173-176 incl. diagrs. 1938.
DLC, S599.R9A7, v. 6

An apparatus for measuring the volume change of ground in freezing consists of a laboratory balance and 2 concentric containers. A 10 to 15-cc. sample is weighed in a low f.p. liquid within an accuracy of ± 0.01 gm. before and after freezing, and the accompanying volume changes are recorded. The apparatus can also be used for laboratory determinations of freezing temperature of water in porous ground.

SIP U5807

Lunin, B. S.
PROBLEM OF CALCULATING THE FOUNDATIONS UNDER PERMAFROST CONDITIONS. (K voprosu o raschete fundamentov v usloviîakh vechnoĭ merzloty; Text in Russian). Trudy Komiteta po Vechnoĭ Merzlote, 6:203-206 incl. diagrs. 1938.
DLC, S599.R9A7, v. 6

Tsytovich's formula for calculating the depth of foundation in permafrost is considered inadequate because certain contributing factors are not considered. These factors include the surface conditions of the ground, the effects of vegetation and snow cover, the laws of heat transmission and thermodynamics during annual temperature fluctuations of the ground. (See also SIP U70)

SIP U5808

Tsytovich, I. A.
ANSWER TO THE PAPER OF B. S. LUNIN "PROBLEM OF CALCULATING THE FOUNDATIONS UNDER PERMAFROST CONDITIONS." (Otvet na stat'îu B. S. Lunina "K voprosu o raschete fundamentov v usloviîakh vechnoĭ merzloty;" Text in Russian). Trudy Komiteta po Vechnoĭ Merzlote, 6:207-210, 1938.
DLC, S599.R9A7, v. 6

Tsytovich's formula on the depth of foundation in permafrost was developed in 1928 prior to present information on permafrost conditions and is considered an approximation. The introduction of the coefficient of heat transfer in Lunin's formula is unnecessary because the heat loss of the foundation to the ground is equal to the amount of heat transferred to the surface of contact between the ground and the foundation. (See also SIP U5807)

SIP U5809

Davis, Raymond E.
ENTRAINED AIR BENEFICIAL IN FREEZING AND THAWING TESTS. J. Am. Concrete Inst. 15:552, table, June 1944.
DLC, TA680.A515, v. 15

The results of investigations to determine the freezing-and-thawing resistance of concretes containing air entraining agents are tabulated. All 5 agents tested, whether water-soluble or insoluble, produced beneficial results. The total expansion produced after 600 cycles of freezing-and-thawing in water and after an additional 54 cycles in 10% solution $CaCl_2$ decreases with the decrease in weight of the concrete. The same trend, though not as perfect, is evident in weight losses and loss of strength.

SIP U5810

Reagel, F. V.
AIR-ENTRAINING AGENTS NOT A CURE-ALL. J. Am. Concrete Inst. 15:563-567 incl. graphs, June 1944.
DLC, TA680.A515, v. 15

The effect of air entraining agents on the deterioration of Mo. pavements by alternate freezing-and-thawing was investigated by measuring the percentage loss in dynamic modulus. The percentage loss in dynamic modulus is plotted against the number of cycles of freezing-and-thawing. Abnormal air contents cause no appreciable improvement in the durability of concretes containing chert aggregates but are beneficial to those containing limestone aggregates. Concrete containing one type of limestone

aggregate when soaked during the entire curing period showed a radical improvement by larger than normal entrapped air quantities.

SIP U5811

PROTECTING CONCRETE IN SUB-ZERO WEATHER. Concrete, 52, No. 6:18, 31 incl. illus. table, June 1944.
DLC, TA680.C7, v. 52

Concreting methods used in constructing the MacArthur Lock on the St. Mary's Falls Canal at Saulte Ste. Marie (Mich.) at -33°F are described. Concrete was pumped through the tops of plywood and canvas huts enclosing completely the blocks being concreted. Two electric steam blowers in each hut kept form and interior air temperatures within the seventies. Blowers were serviced by 2-in. leads from 6-in. arterial steam lines laid on each side of the dock. Three 200 Double, gasoline-powered Pumpcretes with 8-in. pipelines were used. The concrete was pumped to an average distance of 500 and a maximum distance of 1100 ft. The pipelines were not heated, and the concrete showed but a few degrees loss of heat between mixers and forms. The temperature of the mixed concrete was held between 50°-80°F.

SIP U5812

Stepanov, K.
ICE CROSSING OF A LARGE CAVALRY UNIT. (Pereprava po l'du krupnogo soedineniia konnitsy; Text in Russian). Voennyĭ Vestnik, 20, No. 2:61-68 incl. table, diagrs. 1941.
DLC, U4.V87, v. 20

An ice crossing prepared in a region with stable winter conditions is described. The crossing region was about 20 km. wide, the ice not less than 45 cm. thick, and was covered by snow, 20-45 cm. thick. Loads were calculated for a layer of transparent ice, 30 cm. thick. The snow cover was removed and the ice cover was reinforced by an additional ice layer 3-5 cm. thick. The crossing served military needs satisfactorily. The results indicate the necessity of complete snow removal. Snow compaction over an ice crossing has proved unsatisfactory.

SIP U5813

Sukhodol'skiĭ, E. I.
CONSTRUCTION OF A RAILROAD BED IN NORTHERN REGIONS UNDER PERMAFROST CONDITIONS. (O sooruzhenii zemlianogo zheleznodorozhnogo polotna v usloviiakh severnykh raĭonov oblasti vechnoĭ merzloty; Text in Russian with English summary). Akademiia Nauk SSSR, Trudy Instituta Merzlotovedeniia im. V. A. Obrucheva, 2:5-29, 31-37, 79-120 incl. illus. tables, graphs, diagrs. 1946. 22 refs.
DGS, 941(570)Ak12t2, v. 1-2

Construction of railroad beds in the permafrost areas of the Taimyr Peninsula was investigated during 1936-1937. Five basic principles are recommended: selection of optimum degree of slope for embankments and cuts; the maintenance of 0°C temperature near the surface of the roadbed throughout the year; drainage of excessive water; heights of 1.5-2 m. for causeways and embankments; and the construction of elevated roadbeds of good local material.

SIP U5814

Sukhodol'skiĭ, E. I.
CONSTRUCTION OF A RAILROAD BED IN NORTHERN REGIONS UNDER PERMAFROST CONDITIONS. ORGANIZATION OF PRELIMINARY OPERATIONS. (O sooruzhenii zemlianogo zheleznodorozhnogo polotna v usloviiakh severnykh raĭonov oblasti vechnoĭ merzloty. Organizatsiia podgotovitel'nykh rabot; Text in Russian). Akademiia Nauk SSSR, Trudy Instituta Merzlotovedeniia im. V. A. Obrucheva, 2:29-31 incl. diagr. 1946.
DGS, 941(570)Ak12t2, v. 1-2

Bench marks of iron pipes with welded knobs were constructed for railroad surveys in permafrost regions. The bench marks were sunk into drill holes to depths 4-5 times that of the active layer. The pipes were sprayed with water to approximately the boundary of the active layer, were then covered with an insulating layer of peat or moss to form a cone, 0.5 m. high and 1.5-2 m. at the base. Wooden poles may serve as bench marks if completely submerged under conditions of good drainage or low water content. The portion in the active layer must be carefully planed and tarred.

SIP U5815

Graham, R. C.
A SPOT CAUSED BY SNOWFLAKES IN THE BEAM OF A CEILING PROJECTOR. Bull. Am. Meteorological Soc. 24:378-379, Dec. 1943.
DLC, QC851.A6, v. 24

The spot appears at night at about 1200 ft. when light dry snow is falling with light winds. The sighting tube is inclined at the same angle as the projector beam under the conditions at Malton (Ont.) when the alidade reads 1200 ft. Experiments made when clouds were above 3500 ft. showed that the spot was visible only from points in the plane of the projector beam and the base line and that its elevation measured at several points along the base line had a constant value of 71°. The spot is probably due to the reflection of the projector beam by the underside of snowflakes falling in horizontal position. The possible effect of the spot on ceiling reports is discussed.

SIP U5816

Wexler, Raymond
RADAR ECHOES FROM A GROWING THUNDERSTORM. Sci. Rept. No. 1, Mt. Washington Observatory, 15p. incl. tables, graphs, June 30, 1952. 20 refs. (Contract AF 19 [122]-399)
DLC, T.I.D., TIP U25140

The theoretical growth of hail in a cumulus cloud is computed and the behavior of the first radar echo is analyzed. The analysis indicates that an updraft of 2 m./sec. causes initial echoes at -8°C. The initial radar echoes for 7 storms out of 10 observed by Workman and Reynolds were located at temperatures from -8°C to -11°C and at temperatures from -4° to -6°C for the other 3. Visual measurements of the upward velocity of the top of the cloud made in only 4 cases, show values between 2 and 3 m./sec. Thus a good agreement exists between this theory and the observations made. The possible connection between hail growth and thunderstorm electricity is discussed.

SIP U5817

Kennedy, Henry L.
THE FUNCTION OF ENTRAINED AIR IN CONCRETE. J. Am. Concrete Inst. 39:529-542 incl. illus. graphs, June 1943; Discussion, by M. Spindel, p.(544-1)-(544-4), Nov. 1943.
DLC, TA680.A515, v. 39

Results of exploratory investigations of the action of air-entraining agents on the individual constituents of concrete are reported. Specimens were repeatedly frozen at -11°F and thawed at 70°F for 24 hr. respectively. The minimum additional air required to increase materially the resistance to freezing-and-thawing is 3% of the volume of the concrete. Improvement of resistance to freezing-and-thawing by air-entraining agents is due to their action on the aggregate alone since admixture does not benefit cement paste. The improvement obtained from admixture is due to the added air and not to a specific air-entraining agent, since it is lost when the entrained air is removed. There is a critical cement content beyond which no improvement in frost resistance can be effected by air-entraining agents.

SIP U5818

Odell, N. E.
OBSERVATIONS ON THE ROCKS AND GLACIERS OF MOUNT EVEREST. Geographical J. 66:289-313 illus. Oct. 1925; Discussion, p.313-315.
DLC, G7.R91, v. 66

The stratigraphy of Mt. Everest and Rongshar regions is presented. Frost action and mechanical action of glaciers on the Mt. Everest massif are described. Low mean annual temperature, extreme dryness, great altitude, and a tropical sun have produced results which are different from other effects in glaciated regions of more temperate climate or higher latitudes. The low mean temperature of the glacial ice gives it a high degree of rigidity or viscosity, a coarse texture, the granules being about the size of walnuts, and a slow rate of flow. A temperature of 105°F in the sun combined with low atmospheric pressure produces high evaporation, and streams do not form in the upper parts. The southern sides of all ice pinnacles are markedly steep due to slight inclination of the sun to the south. Stone polygons, 4 ft. in diam. containing a network of secondary fissure polygons, were found at altitudes of about 17,000 ft. These formations are similar to those in circumpolar regions.

SIP U5819

Denmark. Ministry for Shipping and Fisheries
DANISH ICE SERVICE AND ICE INVESTIGATIONS. Hydrologische Konferenz der Baltischen Staaten, 5, No. 13B:1-24 incl. map, June 1936. 3 refs.
DLC, GB651.H8, v. 5

A normal ice winter is almost non-existent in Danish waters because the country is located in a meteorological border area of highly unstable temperature fluctuations. Easterly and northeasterly winds caused by high barometric pressure which has become stationary are prerequisite for ice formation in Danish waters. Ice formation in the fairways is also affected by 2 currents, one of comparatively fresh water and the other rather warm and salty. The only practical means of predicting ice formation in the fairways is the measurement of temperature of the water at the surface and at a depth of 5 m. The time of ice break-up deviates widely from year to year and is caused by winds shifting to the west coupled with a rise in temperature. Methods of ice reporting by the government are briefly reported. The various types of ice formations in Danish waters and the conditions of formation are described. Corresponding Danish terms are given.

SIP U5820

Speerschneider, C. J.
REMARKS CONCERNING THE QUESTIONNAIRE ON ICE CONDITIONS. (Bemerkungen anlässlich des Rundfrageformulars über Eisverhältnisse; Text in German). Hydrologische Konferenz der Baltischen Staaten, 5, No. 13C:1-2, June 1936.
DLC, GB651.H8, v. 5

A small portion of the ice in Danish waters melts in the spring; the major part drifts northward. Baltic Sea ice forms in 2 distinct areas (Bothnian and Finnish Bays, and the western Baltic Sea) separated by an area that is nearly always ice-free. Accurate ice forecasting is considered almost impossible due to the dependence of ice formation on variable winds. The main navigation channels never freeze suddenly due to the effects of easterly winds passing over the relatively warm Baltic Sea. Danish waters remain ice-free as long as the temperature at the 5-m. depth remains above 0°C. Recommendations include ship-to-shore ice reports, increased icebreaker service, and air surveys.

SIP U5821

Stakle, P.
ICE CONDITIONS IN THE BALTIC SEA AND THEIR INVESTIGATION. (Die Eisverhältnisse der Ostsee und ihre Erforschung; Text in German). Hydrologische Konferenz der Baltischen Staaten, 5, No. 13A:1-106 incl. illus. tables, diagrs. appendix, June 1936. [30] refs.
DLC, GB651.H8, v. 5

The ice conditions in the coastal waters of Denmark, Free City of Danzig, Germany, Estonia, Finland, Latvia, Lithuania, Poland, Sweden, and the USSR are reviewed. The reports are based on the appended questionnaire from the Hydrological Conferences of the Baltic States.

SIP U5822

Parkhomenko, S. G.
PERMAFROSTOLOGY AS THE SCIENCE OF CRYOPHILIC ROCKS. (Merzlotovedenie kak uchenie o kriofil'nykh gornykh porodakh; Text in Russian with English summary). Trudy Komiteta po Vechnoĭ Merzlote, 6:177-194, 1938.
DLC, S599.R9A7, v. 6

Permafrost investigations are made from either geothermal or geological considerations. Geological techniques are preferred in theoretical and applied permafrostology. A new method of permafrost research is suggested from the geological and petrographical viewpoint. Permafrost is regarded as cryophilic rock, a viewpoint which favors an extensive development of permafrostology.

SIP U5823

Sumgin, M. I.
SOME NOTES ON PARKHOMENKO'S PAPER: "PERMAFROSTOLOGY AS THE SCIENCE OF CRYOPHILIC ROCKS." (Neskol'ko zamechaniĭ po povodu stat'i S. G. Parkhomenko "Merzlotovedenie kak uchenie o kriofilnykh porodakh;" Text in Russian with English summary). Trudy Komiteta po Vechnoĭ Merzlote, 6:195-201, 1938.
DLC, S599.R9A7, v. 6

Parkhomenko's contribution to permafrostology from a geological and petrographical point of view is criticized. Nothing new is proposed with the definition of permafrost as cryophilic rock. (See also SIP U5822)

SIP U5824

Kidson, E.
THE FREQUENCY OF FROST, SNOW, AND HAIL IN NEW ZEALAND. New Zealand J. Sci. Tech. 14, No. 1:42-54 incl. graphs, maps, Aug. 1932.
DLC, Q1.N55, v. 14

Maps are drawn showing the number of days of ground frost (minimum temperature below 30.4°F. 1 in. above ground) per year and per month, the number of days per year with shade temperature below freezing (at 4 ft. above ground) and the number of days per year with hail. The number of days on which snow falls is mapped as accurately as meager data permit. The annual distribution of frosts and hailstorms in North Island and South Island are plotted and compared. Graphs showing the annual distribution of days of snowfall for North Island, South Island and the high levels are presented. Snow falling on the lower levels melts practically as soon as it falls but has a tendency to lie on high plateaus. Frost is likely to occur in any month of the year in practically all parts of New Zealand.

SIP U5825

Tenney, Dwight and James L. Young, Jr.
HEAT PUMP SYSTEM SIMPLIFIES FREEZE-AND-THAW TESTING...Refrig. Eng. 58:768-770 incl. tables, diagrs. Aug. 1950.
DLC, TP490.R35, v. 58

The freeze-and-thaw tests are performed by saturating concrete specimens in water, freezing them in air and thawing them while submerged in water. Test conditions define the rate of freezing at 10°F/hr. The specimens enter the freeze-and-thaw test completely saturated, which condition is maintained so that one freezing cycle exactly duplicates another. Thawing raises the specimen temperature from 0° to 40°F in 2 hr. and freezing lowers it from 40° to 0°F in 4 hr. The cycling arrangement of 2 freezing rates and 1 heating stage is described. A large volume of recirculated air keeps the air temperature differential low and the efficiency of the cooling coils high.

SIP U5826

Ponomarev, V.
PERMAFROST AND MINE WATERS IN THE ARCTIC. ("Vechnaîa" merzlota i rudnichnye vody v Arktike; Text in Russian). Sovetskaia Arktika, 2, No. 4:111-116 incl. graphs, diagrs. 1936.
DLC, G600.S6, v. 2

Temperatures along a mine shaft in Yakutia and Amderma are plotted to depths of 120 and 216 m. respectively. The temperature at 216 m. was -5°C and at 120 m., -3°C. The curve of Amderma permafrost penetration indicates the degradation which can be observed in any arctic region having a similar climate. The geothermal gradient law does not apply to permafrost at Amderma where permafrost reaches a depth of 400 m. Permafrost begins under the Amderma River at a depth of 2 m. and lower under the larger rivers. The distribution of the permafrost table under the sea is graphed.

SIP U5827

Loucks, Charles S.
THE "DECONS" AND THE AIR LIFT. Armed Forces Chem. J. 3, No. 6:16, 38 incl. illus. Oct. 1949.
DLC, Unbound periodical

The Chemical Corps' truck-mounted, power-driven decontamination apparatus can defrost the control and lifting surfaces by spraying isopropyl alcohol for 4-6 min. on grounded, frost-covered aircraft. The previous method of ladders and brooms required several man hours. A kerosene and alcohol mixture, though an effective frost cutter, was a fire hazard. An alcohol and glycerine mixture was satisfactory but too expensive. Isopropyl alcohol was the most satisfactory frost-cutter tested and its prolonged use has not caused any harmful action on any part of the aircraft. The efficiency of isopropyl alcohol, 2 hr. as compared to 6 hr. for a mixture of equal parts of isopropyl alcohol and glycerine, is considered satisfactory.

SIP U5828

Geletskiĭ, E.
CHLORINE AS AN ACCELERATOR OF SETTING OF CONCRETE. (Khlor kak uskoritel' skhvativaniia betona; Text in Russian). Stroitel'naia Promyshlennost', 15, No. 5:35-36 incl. tables, 1937.
DLC, TH4.S85, v. 15

The compressive strengths of concrete samples prepared with Cl water, with Cl and $CaCl_2$ and with ordinary water were measured after setting for 7 and 28 days at temperatures of 15° and -9°C. Cl was found to act as a catalyst in accelerating the setting of concrete. The compressive strength of samples treated with $CaCl_2$ and with $CaCl_2$ plus Cl increased from 9.12-23.62 kg./sq.cm. after 7 days and from 28.51-36.55 kg./sq.cm. after 28 days respectively.

SIP U5829

Deeley, R. M. and P. H. Parr
ON THE VISCOSITY OF GLACIER ICE. Phil. Mag. 6th ser. 26:85-111 incl. tables, graphs, maps, diagrs. July 1913. 19 refs.
DLC, Q1.P5, v. 26

Observations and measurements made by Blümcke and Hess on the Hintereis Glacier, Otztal (Austrian Alps) concerning its dimensions, velocity of glacier flow, and amount of slip occurring between the ice and the bedrock upon which it rests are discussed. Calculations of viscosity based on a winter velocity of 42.1 m./yr., a slip of 20.64 m./yr. by fitting an ellipse to the section of the glacier are given. Calculations of viscosity using a form of curve resembling a glaciated valley more closely than an ellipse are appended.

SIP U5830

Zhukov, V. F.
FOUNDATION LAYOUT OF THE CENTRAL YAKUTSK ELECTRIC STATION IN PERMAFROST. (Ustroĭstvo fundamentov Iakutskoĭ ėles v usloviiakh vechnoĭ merzloty; Text in Russian). Stroitel'naia Promyshlennost', 15, No. 5:12-15 incl. illus. graphs, diagrs. 1937.
DLC, TH4.S85, v. 15

Slender concrete pillars, weighing 9000 kg., were sunk into the ground 4.5 m. at a pressure of 3 kg./sq. cm. and surrounded by coarse sand to a depth of 2.5 m. Beams were placed in the sand connecting the pillars for reinforcement. The construction was conducted in 3 phases. The foundations were laid in winter under wooden huts heated to 10°-22°C. Concreting operations took place in spring, and the superficial structure was completed in summer.

SIP U5831

Smith, H. R.
CONTROLLING FROST EFFECTS ON ROADS WITH CALCIUM CHLORIDE. Roads and Eng. Construction, 88: 85-86, 106-108 incl. illus. table, Dec. 1950. 7 refs.
DLC, TA1.R58, v. 88

Chemical treatment of road subgrades and subbases, using $CaCl_2$ to prevent damage to roads by frost is discussed. A 10% solution of $CaCl_2$ mixed in the soil lowers the f.p. so that ice lenses do not form until a temperature of -1.5°F is reached. Vertical drains, 7 in. in diam., 6 ft. deep at 5-ft. intervals filled with clean sandy gravel and 3.5 gal. of a solution of 100 lb. of $CaCl_2$ to 30 gal. water permit the drainage of meltwater through the frozen zone and prevent loss of stability in the spring. Silt is protected from frost heave by adding 2% $CaCl_2$; 1% $CaCl_2$ will protect clay and 0.5% will protect graded mixes.

SIP U5832

Keso, Lauri
OBSERVATIONS ON DRAINAGE IN CLAY AND FROZEN SOILS. (Beobachtungen über den Dränabfluss in Tonböden und in gefrorenen Böden; Text in German). Hydrologische Konferenz der Baltischen Staaten, 5, Sec. 4B:1-4 incl. graphs, June 1936.
DLC, GB651.H8, v. 5

Tests were conducted to determine the water permeability of Finnish clay soils and of frozen soils. The automatic recordings of the drainage meter indicate that run-off from frozen soil increased during the noon hours and that in general slight temperature elevations during the winter caused greatly increased run-off.

SIP U5833

Slanciītājs, L.
ICE CONDITIONS AT THE LATVIAN COASTS OF THE RIGA BAY AND TEMPERATURES DURING THE ICE WINTERS. (Die Eisverhältnisse an den lettländischen Küsten des Rigaer Meerbusens und die Temperaturen während der Eiswinter; Text in German). Hydrologische Konferenz der Baltischen Staaten, 5, Sec. 13B:1-9 incl. tables, graphs, June 1936. 6 refs.
DLC, GB651.H8, v. 5

The results of 15 yr. of ice observations at 6 stations on the Latvian coasts of Riga Bay are analyzed. The

tabulated data include the mean and the earliest dates of first seasonal ice appearance, the mean dates of the formation and end of a heavy ice cover, the mean and latest dates of ice disappearance, and the number of days with ice cover. The mean temperature curves of the period 1920-1924 are presented. A maximum of 173 ice days occurred at Ainsže where the mean number of ice days was 121 days, 75 of which had heavy ice formation. A maximum of 85 ice days and a mean of 46 days occurred at Oviši which held the record for lowest number of ice days.

SIP U5834

Kullberg, Gösta
EXPERIMENTS WITH SNOWPLOWS. (Försök med snöplogar; Text in Swedish). Svenska Vägförening. Tid. 37:64-69 incl. illus. tables, graphs, March 1950.
DLC, Unbound periodical

The effectiveness of cylindrical and conical shaped plow blades was experimentally determined with scale models (1:5). A small steel ball was thrown head-on against soot-covered blade models at a predetermined velocity. The trajectory of the ball was thus traced and the angle of discharge determined. The results for 7 different models are tabulated. Electrically driven full-scale models were also tested on a special track at speeds from 12-50 km./hr. A satisfactory substitute for snow consisted of 30% sawdust, 37% sand and 33% paraffin. Small boxes were arranged in parallel rows to collect the snow substitute when the model was being tested. This arrangement permits easy determination of the casting width. One model increased the casting width by 30% and will be tested further.

SIP U5835

Hjort, Ivar
METHOD TO PREVENT ICE FORMATION AROUND WOOD CONSTRUCTIONS IN LEADS FOR LOGGING. (Metod att förhindra isbildning omkring träkonstruktioner i flottleder; Text in Swedish). Svenska Flottledsförbundets Årsbok, 24:4706-4711 incl. illus. graphs, 1950.
DLC, SD1.S893, v. 24

The melting of surface ice in regulated inland waters by utilizing warmer bottom water was improved by 2 Swedish patents. One patent introduced special nozzles on the air-leading pipes that reduced the consumption of compressed air without loss of effectiveness. The other patent utilized sinusoidal shaped double pipes by which the ice-free zone was increased by some 50%. These improved methods are used to prevent ice formation around leads for floating logs. Elementary theories on ice formation in inland waters are discussed. The results depend on the temperature of the bottom water in individual cases.

SIP U5836

Wall, E.
A SIMPLE SCHEME OF ATMOSPHERIC ICE-NUCLEI FORMATION. (Einfaches Schema der atmosphärischen Eiskeimbildung; Text in German). Meteorologische Z. 59:177-183 incl. table, graphs, June 1942. 8 refs.
DLC, QC851.M3, v. 59

A static concept of the kinetic process of nucleus formation is presented. The various cases of phase formation on atmospheric nuclei are discussed. It is assumed that a given water nucleus is equal to an ice nucleus with respect to its ability to form ice. Thomson's equation is used to indicate the relationship between nucleus size and supercooling for the equivalent water or ice nuclei. The size of the water or ice nuclei, which are equivalent to the atmospheric nuclei, is therefore derived from the observed nucleus effectiveness. The physical and meteorological factors which determine atmospheric ice nuclei formation are distinguished.

SIP U5837

Findeisen, W.
EXPERIMENTAL INVESTIGATIONS OF ATMOSPHERIC ICE PARTICLE FORMATION. PROVISIONAL REPORT. (Experimentelle Untersuchungen über die atmosphärische Eisteilchenbildung. Vorläufige Mitteilung; Text in German). Meteorologische Z. 59:349-353, Nov. 1942. 11 refs.
DLC, QC851.M3, v. 59

Results of experimental investigations made from 1938-1942 are reported to present proof of the validity of earlier concepts concerning the processes of atmospheric precipitation formation. The following conclusions were reached. Ice-nuclei formation is observed in the laboratory at the same temperatures as in the atmosphere. A preceding droplet formation is not required for ice nuclei formation. Sublimation nuclei of varying properties coexist in the atmosphere. The number of sublimation nuclei in the air changes significantly from day to day. Sublimation nuclei may be artificially produced.

SIP U5838

Sauberer, F.
SURFACE SEICHES ON THE FROZEN LUNZER UNTERSEE. (Oberflächenseiches am zugefrorenen Lunzer Untersee; Text in German). Meteorologische Z. 59:379-381 incl. diagrs. Nov. 1942.
DLC, QC851.M3, v. 59

Fluctuations of the frozen lake surface were observed by means of a regular and an auxiliary limnograph, erected on a pole extending through a hole in the ice surface at a distance of about 15 m. from the shore. The gage continued to record after freezing of the lake in a manner similar to that in open water. Seiches occur even when the lake is completely frozen. The results indicate that the motion of the ice, 14-18 cm. thick, was plastic.

SIP U5839

Kienle, J. von
A LOCAL SNOWFALL IN MANNHEIM. (Ein Stadtgebundener Schneefall in Mannheim; Text in German). Meteorologische Rundschau, 5:132-133 incl. graph, map, July-Aug. 1952. 1 ref.
DLC, QC851.M2843, v. 5

Snow fell on Jan. 28 and 30, 1949 in Mannheim, but the surrounding area had mostly clear skies. The weather conditions were calm with a large surface inversion and fog. The snow crystals exhibited fully developed hexagonal stars with fine crystalline growths on the branches. The localized release of snow is attributed to the impregnation of the fog and low stratus clouds by chemical impurities from industrial wastes, raising the f.p. of the supercooled droplets.

SIP U5840

Kreutz, Wilhelm
FROST PENETRATION IN SOILS UNDER EQUAL AND DIFFERENT CLIMATIC CONDITIONS DURING THE VERY COLD WINTER 1939/40. (Das Eindringen des Frostes in Böden unter gleichen und verschiedenen Witterungsbedingungen während des sehr kalten Winters 1939/40; Text in German). Reichsamt für Wetterdienst (Luftwaffe), Wiss. Abhandl. 9, No. 2: 1-22 incl. tables, graphs, 1942. 1 ref.
DLC, QC851.G4, v. 9

Sand, clay, humus, clayey sand, and very fine basalt gravel were placed into the ground in 7 cu. m. containers, 1.75 m. deep, in an open experimental field (lysimeter installation) to observe the influence of equal climatic conditions on different soils. Fuess remote thermographs and Hg soil thermometers were used to measure the temperatures at depths of 10, 20, 50, and 100 cm. The temperatures in various soils and depths from Dec.-March, daily and monthly means of air and soil temperatures, the isotherms in the various soils and at comparative stations, and the surface temperatures are plotted and analyzed. Results show the clear dependency of the frost depth, penetration speed and duration on the physical properties of the soil. The frost penetrated a maximum of 43 cm. in organic soils and 89 cm. in mineral soils. The speed of penetration varied between 0.6-2.5 cm./day. Frost penetration occurred 19 days later in organic soils and remained up to 3 weeks longer than in mineral soils.

SIP U5841

Sanvélian, Stéphane
TECHNICAL REPORT. TRACKED VEHICLES, SLEDS AND MATERIAL. COMPARISON WITH GREENLAND. (Rapport technique. Vehicules à chenilles, traineaux et matériel. Comparaison avec Groenland; Text in French). p.53-55 incl. illus. (In: Travaux en Islande 1950-1951, Rapports préliminaires sér. sci. No. 18). [1951]
Arctic Inst. N. America

Terrain conditions on the east coast of Greenland and on Vatnajökull (Iceland) are similar with respect to the trafficability of Weasels. The motors operated efficiently at altitudes from 500-1600 m., traveling at speeds of 10-12 m.p.h. Prestone antifreeze was satisfactorily used at temperatures near -20°C. Al sleds were used to haul the instruments and equipment, and a Nansen-type sled for carrying gasoline cans. Clothing recommendations are made, and camping equipment is described.

SIP U5842

Greim, Georg
SNOWFALL IN HESSE DURING THE YEARS 1901-1930. (Der Schneefall in Hessen in den Jahren 1901-1930; Text in German). Reichsamt für Wetterdienst, Wiss. Abhandl. 5, No. 8:1-26 incl. tables, graphs, maps, 1939. 10 refs.
DLC, QC851.G4, v. 5

A critical evaluation of snowfall data, obtained from monthly lists of daily precipitation amounts for all Hessian stations, is presented. The number of days with snowfall for the individual months, the amounts of fallen snow, the number of days with snowfall, the mean snow density, the share of snow of the total precipitation, and the periodical variation of snowfalls, are tabulated and discussed.

SIP U5843

Church, J. E., Jr.
RECENT STUDIES OF SNOW IN THE UNITED STATES. Quart. J. Meteorological Soc. 40:43-52 incl. tables, diagrs. Jan. 1914. 1 ref.
DLC, QC851.R8, v. 40

Three types of snow samplers, a spring balance, the Fergusson recording rain and snow gage, and the Nipher screen are discussed. Snow density, water equivalent, and progressive melting can be determined with snow samplers and spring balances. Data obtained in the Lake Tahoe Basin indicate that treeless meadows store maximum snow at the beginning of the season, dense fir forests retained 25% of their total store after the meadow had been bare a week, and the more open pine and fir forests retained 5% of their total store. Snow evaporation experiments indicate an extremely high evaporation rate at the summit of bare mountains and high water retention in forested slopes.

SIP U5844

Devik, Olaf
NORWEGIAN INVESTIGATION OF ICE CONDITIONS, ICE FORMATION AND HEAT TRANSFER. (Norwegische Untersuchungen betreffs Eisverhältnisse, Eisbildung und Wärmeumsatz; Text in German). Hydrologische Konferenz der Baltischen Staaten, 5, No. 7E; 1-4, June 1936. 7 refs.
DLC, GB651.H8, v. 5

Thermal and dynamic conditions of ice formation in rivers were studied and the results applied to the Glomma River (Norway). Water surface tempera-

tures were measured with a thermopile designed for high accuracy. Ice formation in flowing water (dynamic ice formation) is attributed to turbulence and supercooling which are preconditions for ice-crystal growth on floating nuclei and solid bodies. Reference is made to studies of Ahlmann and Sverdrup concerning turbulence as a source of heat transfer. (See also SIP U789)

SIP U5845

Welner, A.
THE WATER LEVELS AND ICE CONDITIONS OF THE RIVER NARVA. (Die Wasserstände und Eisverhältnisse des Narvaflusses; Text in German). Hydrologische Konferenz der Baltischen Staaten, 5, No. 7A:1-23 incl. tables, graphs, June 1936. 4 refs.
DLC, GB651.H8, v. 5

Previous research indicated that anchor ice can occur both in quiet waters and near the rapids of the Narva in the absence of an ice cover. Anchor ice accumulates extensively over rocky river beds. Round and hexagonal ice crystals, 5-10 mm. in diam. and 1-2 mm. thick were observed by Jelochin in the winter of 1920-21. Anchor ice disappears by the end of Feb. due to increased solar radiation. The river ice blocks turbines during the winter and causes temporary water shortages. Reduced water flow and level cause river-bed erosion. Water levels from 1922-31 are graphically presented; and water, air temperature, and ice formation data are tabulated.

SIP U5846

Kumm, A.
THE FORMATION OF ELECTRIC CHARGES DURING PROCESSES IN THE CRYSTALLINE ICE PHASE. (Über die Entstehung von elektrischen Ladungen bei Vorgängen in der kristallinen Eisphase; Text in German with English summary). Arch. Meteorologie, Geophys. u. Bioklimatologie, Ser. A, 3: 382-401 incl. tables, graphs, diagrs. 1951. 13 refs.
DLC, QC851.A73, v. 3A

Electric charges which appear when small ice crystals are detached from hoarfrost layers were investigated. The formation of ice fragments was studied microscopically, as well as the effect of various experimental conditions on the process. The fragment charges are measured quantitatively by vacuum tube electrometers to 10^{-15} coulomb. Charges to 2.4×10^{-16} coulomb were qualitatively measured by deflecting falling particles in a transverse electric field. The particle quantity increases rapidly with decreasing charge of the individual particle, but remains constant below 3.3×10^{-16} coulomb. The number of positively charged particles is about 7 times that of the negative ones. The mean value of charge, positive or negative, carried by a single particle is about 7×10^{-16} coulomb. The origin of the electric charges is attributed to the polarity of ice crystals and the piezoelectric property.

SIP U5847

Albrecht, Fritz
INVESTIGATIONS OF THE HEAT ECONOMY OF THE EARTH'S SURFACE IN VARIOUS CLIMATIC REGIONS. (Untersuchungen über den Wärmehaushalt der Erdoberfläche in verschiedenen Klimagebieten; Text in German). Reichsamt für Wetterdienst, Wiss. Abhandl. 8, No. 2:1-80 incl. tables, graphs, maps, diagrs. 1940. 70 refs.
DLC, QC851.G4, v. 8

The heat economy of 12 stations distributed throughout the world in different characteristic climatic regions is calculated. The annual trend of the heat economy of the Polar Sea north of eastern Siberia indicates that above the arctic drift ice, during the duration of the ice cover, the heat intake exceeds the heat output by about 4 kcal./sq. cm./yr. Heat conditions at Sodankylä (Lappland) and Irkutsk (USSR) are compared with those at Potsdam (Germany). Evaporation in Irkutsk and Sodankylä is limited to 6 summer months, and is small in comparison to precipitation. The freezing and thawing of the soil and the melting of the snow cover cause a relatively large thermal intake by the soil at these stations. Station Eismitte (Greenland) indicates a considerable radiation loss of 7.5 kcal./sq. cm./yr.

SIP U5848

Steinhäusser, Hans
NORMAL ELEVATIONS FOR CHARACTERIZING SNOW COVER CONDITIONS. (Normalhöhen zur Kennzeichnung der Schneedeckenverhältnisse; Text in German). Meteorologische Rundschau, 3:32-34 incl. tables, graphs, Jan.-Feb. 1950. 7 refs.
DLC, QC851.M2843, v. 3

The mean date of the beginning of maximum snow depth shifts towards summer with increasing elevation, is almost linear above 1200 m., and shifts only slightly between 900-1200 m. The anomalies of snow cover duration, maximum snow depth, and the initial time are converted to normal elevations, which indicate at which elevations the resulting mean values of these 3 snow-cover magnitudes are normal. (Author's abstract)

SIP U5849

Steinhäusser, Hans
THE ANNUAL COURSE OF THE WATER REGIME OF SOUTH ALPINE RIVER AREAS. (Der Jahresgang des Wasserhaushaltes südalpiner Flussgebiete; Text in German). Meteorologische Rundschau, 3:243-247 incl. tables, graphs, Nov.-Dec. 1950. 14 refs.
DLC, QC851.M2843, v. 3

The mean monthly water retention and release are calculated by means of the water balance equation which includes mean annual values of evaporation. A comparison of preliminary estimates of snow retention from existing snow depth measurements indicates that the total release is smaller than the

snow release. The difference is attributed to excessive ground water storage, and marked sheltering effects of the highland rim of the southern Alps on rain and snowfall.

SIP U5850

Menzl, Oswald
THE SNOW CONDITIONS ON THE DONNERSBERG. (Die Schneeverhältnisse auf dem Donnersberg; Text in German). Meteorologische Rundschau, 4:149-151 incl. tables, July-Aug. 1951. 9 refs.
DLC, QC851.M2843, v. 4

The tabulated data for the period 1905-1935 include the percentage of snow of the total precipitation, number of days with snowfall, number of days with snow cover, and the percentage sequence of days with snow. It is shown that 28.7% of the total precipitation is snow, the mean number of days with snowfall is 74.3, and the mean number of days with snow cover is 113.8.

SIP U5851

Aitken, John
GROUND-ICE. J. Scot. Meteorological Soc. 18:13-18 incl. illus. 1918. 2 refs.
DLC, QC851.S3, v. 18

Conditions favoring the formation of anchor ice (ground ice) are discussed. A nucleus or free surface must be present before water will change into ice. A laboratory experiment to study the formation of ice in running water is described. The amount of anchor ice formed is larger than the amount of sheet ice formed under similar temperature conditions. The surface protection afforded the water by the ice sheet is lacking and freezing proceeds with maximum efficiency. Ice spicules slip their attachment when the temperature of the water is just above the f.p. and adhere when it is just under it. The amount of heat needed to prevent obstruction of outlets by anchor ice is that required to prevent adhesion, but not the large quantities needed to melt the ice.

SIP U5852

Smellie, James and Andrew Watt
ON A CURIOUS CASE OF "GROUND-ICE." J. Scot. Meteorological Soc. 17:166-173 incl. map, diagr. 1917. 9 refs.
DLC, QC851.S3, v. 17

The causes of anchor ice (ground ice) which clogged the filters and the mouth of the intake pipe of the waterworks at Lochrutton Loch (Scotland) and other nearby reservoirs in 1917 are discussed. The severest winters usually occur with quiet anticyclone conditions, but the low temperatures of Jan. 1917 were accompanied by strong winds causing a surface drift from north to south. Water piled up at the south end of the lake, causing a strong return undercurrent. A thorough mixing of water and the prevailing low temperature formed ideal conditions for the growth of ice on asperities on the lake floor and at perforations of the cylinder.

SIP U5853

[Byers, G.]
THE FREEZING OF THE LIAUHO RIVER, NEWCHWANG, MANCHURIA. Quart. J. Roy. Meteorological Soc. 43:95-98 incl. illus. table, Jan. 1917. (Correspondence and notes)
DLC, QC851.R8, v. 43

A table contains summarized data from 1901-1916 on the freezing of the Liauho at Newchwang (China) in winter and the subsequent break-up in spring, the lowest temperature and its date, the maximum ice thickness and its date, the number of days during which the river was frozen over, and the number during which the river was closed to navigation. The first drift ice appears between Nov. 14-Dec. 13, break-up starts between Jan. 12-March 25, the maximum ice thickness varies from 10-38.75 in. and usually occurs soon after mid-Feb.

SIP U5854

Stankiewicz, M. J.
BREAKUP CAN BE FORETOLD... Pulp & Paper Mag. Can. 48:118-120, Dec. 1947.
DLC, TS1080.P85, v. 48

A method of forecasting opening dates of streams, rivers, and lakes in relation to effective driving is described. The prediction is based on the fact that 144 B.t.u. are required to melt a lb. of snow or ice. A watershed requires a certain amount of solar radiation to melt the snow and ice accumulated during the winter months. The heat absorption and ultimate release of water determines when and where certain drives should be scheduled to open. The accumulated heat required to open a watershed varies with exposure, terrain, snow accumulations, and ice depth and is different for each watershed. Three years of data are sufficient to establish the accumulated heat point at which the drive is expected to open. This point is permanently recorded to predict the opening of the drive in future years. Drive crews are assembled as the progressive heat chart approaches the accumulated heat point.

SIP U5855

Wedderburn, W. S.
THE FREEZING OF FRESH-WATER LAKES. J. Scot. Meteorological Soc. 14:219-224, 1908. 6 refs.
DLC, QC851.S3, v. 14

A lake will not freeze over until all the waters have reached a temperature below 39.2°F. Then convection ceases, conduction and wind-produced currents cause further cooling. Water temperatures of 34°-38°F are often reached before freezing sets in. Lakes, 200 or more ft. deep, seldom freeze over. Water freezing in isolated patches at some distance

from the shores was noted. The surface temperature was 32.8°F within a yd. of such patches. Temperatures of 33.2°, 34°, 34.3°, 34.5°, and 37.4°F were recorded at depths of 1.5 in., 6 in., 9 in., 12 in., and 5 ft. respectively. The temperature below 5 ft. was nearly uniform. Freezing proceeds more rapidly in calm weather than when disturbed by winds. Thickening of the ice sheet is due mainly to conduction. Freezing occurs in spite of surface disturbance when the cold is sufficiently intense. Isolated crystals are formed and combine into pancakes. These pancakes increase in thickness by the freezing of water around them and in diam. up to 3 ft. by the accession of small floating ice crystals. The pancakes freeze together and form a continuous rough ice sheet when the surface becomes calm.

SIP U5856

Orr, John L. and D. G. Henshaw
A NEW CANADIAN LABORATORY FOR ARCTIC TESTING. Refrig. Eng. 57:878-882 incl. illus. graph, diagrs. Sept. 1949.
DLC, TP490.R35, v. 57

The Low Temperature Laboratory of the Mech. Eng. Div. is used to study the behavior of men, materials, and equipment at low temperatures under controlled conditions. Approximately 75% of all tests now carried out in the field will be performed in the laboratory's cold chambers. An icing wind tunnel permits the study of anti-icing protection for aircrafts. One cold chamber is 51 x 15 x 15 ft. in size and the other 2 are 10 x 10 x 8 ft. These chambers can attain a minimum temperature of -80°F. Access to the cold chambers during test runs is afforded by air locks without admitting large volumes of warm moist air. Observation windows are provided at various points to enable the experimental setup to be viewed from all angles.

SIP U5857

Klieger, Paul
STUDIES OF THE EFFECT OF ENTRAINED AIR ON THE STRENGTH AND DURABILITY OF CONCRETES MADE WITH VARIOUS MAXIMUM SIZES OF AGGREGATE. Res. Bull. No. 40, Portland Cement Assoc. Res. and Development Labs. 25p. incl. tables, diagrs. Oct. 1952. 1 ref.
DLC, Unbound periodical

Tests were conducted on concretes made with 3 cement contents, 4, 5.5, and 7 sacks/cu. yd., and 5 maximum sizes of aggregate, No. 4, 0.375-in., 0.75-in., 1.5-in. and 2.5-in. The consistency of all concretes was 2-3 in. as measured by the slump test. One fine aggregate and 1 coarse aggregate were used, and 8 concretes with various air contents were prepared for each combination of cement content and maximum size of aggregate. The results of freezing-and-thawing tests indicate that for the concretes whose prior curing included a period of air-drying, adequate resistance to freezing-and-thawing is secured at 9% of entrained air in the mortar fraction, regardless of cement content or maximum size of aggregate. Concretes cured continuously moist required somewhat more entrained air for the same resistance to freezing-and-thawing. Information on the effect of entrained air on strength, resistance to salt scaling, volume change, and absorption is included. (Author's abstract)

SIP U5858

Zimmerman, John S.
ARCTIC AIRBORNE OPERATIONS. Military Rev. 32, No. 5:23-30 incl. illus. table, Aug. 1952.
DLC, G.P.R.R.

Overland movement in arctic regions is restricted by swamps during the summer and by low temperatures, snow and ice, and absence of roads and trails during the winter. Air transportation is facilitated in winter by good flying conditions and the use of frozen water surfaces as landing fields. Operations include establishing, reinforcing and protecting airfields, bases, meteorological stations, harbors, communications centers, and weather, radar and airway stations. Training and air-transportable equipment are discussed. Snowmobiles, Weasels, cargo sleds and tractors are used in place of wheeled vehicles. Airborne operations in the arctic do not involve new tactical principles, but their application is more difficult. Special considerations in planning operations include aerial photographic reconnaissance, the use of frozen water surfaces as landing fields, determining snow depth, drifts, and prevailing wind direction, and establishing landing fields at elevations not exposed to early morning fogs.

SIP U5859

Lederer, Jerome
WINTERIZATION OF AIRPORT FACILITIES. Aero Digest, 59, No. 3:49-50, Sept. 1949.
DLC, TL501.A292, v. 59

Airport ramps, runways, and aircraft steps are spread with treated sand or cinders to reduce skidding. Moisture is added to sand at a ratio of 3-6%, to cinders at a ratio of 8-15%, and 50 lb. of $CaCl_2$/cu. yd. of sand or 75 lb./cu. yd. of cinders are admixed. The abrasives are stored in covered bins or stockpiles. Corrosion of aircraft parts due to the use of $CaCl_2$ may be prevented by admixing 2% of $Na_2Cr_2O_7$ before application. Poly-phosphate-nitrite-nitrate mix prevents corrosion of steel. Other anti-skidding methods used include spreading of hot sand or clinkers which melt into the ice, pouring water with sand to form an evenly sanded frozen surface, or electric heating of road sections. Runways should be cleared after snowfall and remaining ridges or pockets removed.

SIP U5860

Rundle, R. E.
THE STRUCTURE AND RESIDUAL ENTROPY OF ICE. J. Chem. Phys. 21:1311 incl. table, diagr. July 1953. 8 refs. (Letters to the editor)
DLC, QD1.J94, v. 21

Pauling's theory of the disordered structure of ice crystals, which explains the residual entropy and neutron diffraction data, is challenged. According to a disordered, polar structure with space group C_{6v}^4 - C6mc and respective point positions, and if H_2O molecules are required, the number of configurations is exactly that required to explain the residual entropy. Neutron diffraction intensities for this polar disordered structure are almost identical with those calculated for Pauling's structure except for (10.3) where the observed intensity is 95 as compared to 70 calculated for Pauling's structure and 130 for the polar structure. The polar structure has bent and normal O - H .. O hydrogen bonds, and 2 neighboring O - H stretching frequencies are expected.

SIP U5861

Baylis, John A. and H. H. Gerstein
FIGHTING FRAZIL ICE AT A WATERWORKS. Eng. News-Record, 140:(562)-(565) incl. illus. diagrs. April 15, 1948.
DLC, TA1.E6, v. 140

Frazil-ice formations at the impellers of low-lift pumps consisted of thin, transparent, round flat crystals which grew from 0.125-4 in. in diam. and accumulated in dense, opaque ice masses. The water in the basin had a temperature below 32°F. The ice accumulated late in the evening or early in the morning under varying meteorological conditions and disappeared before noon. The ice formation reduced the pumping capacity causing clogging, which was combated by injecting steam at 90-100 lb./sq. in. into pump suctions raising the water temperature by 0.1°F and bringing it above the range of frazil ice formation. Ice on crib-intake ports is removed by discharging dynamite in front of the openings. An unusual ice plug in an intake shaft was blasted with 0.25 lb. of 60% dynamite.

SIP U5862

SNOW MELTING SYSTEM SERVES TOLL BRIDGE. Heating and Ventilating, 46, No. 7:66 incl. illus. July 1949.
DLC, TH7201.H4, v. 46

Snow-melting coils of 1.25-in. wrought iron pipe and spaced on 12-in. centers having a 2 to 6-in. cover were installed in a road section 82 x 36 ft., of the Raymond E. Baldwin Bridge (Conn.). One automatic air vent is installed for each coil. Hot water is supplied by an oil-fired boiler and is circulated through the system at 130°F by a 3-in. pump. A permanent anti-freeze compound added to the water protects the coils at temperatures as low as -30°F. The system is manually controlled, to operate at the time of a snowfall.

SIP U5863

Silversides, C. R.
BEARING CAPACITY OF ICE. Pulp & Paper Mag. Can. 50, No. 3:248 incl. tables, 1949.
DLC, TS1080.P85, v. 50

Thickness and nature of the ice must be considered in determining the bearing strength of an ice cover over which a haul road is planned. Lake currents, a deep snow cover, and shallow muskeg lakes will reduce the bearing capacity of the ice cover. Dull-colored ice of honeycombed structure has little supporting power. The bearing capacity decreases when the water level underneath the ice falls. Various loads and corresponding supporting ice thickness are tabulated. Instructions for strengthening road surfaces over ice include compaction, snowplowing, flooding, and freezing straw or boughs into the road surface. Reinforcing materials, thicknesses of reinforcement layers, quantities of materials required and resulting increases in bearing strength are tabulated.

SIP U5864

McNeil, Anna W.
DYNAMITE BREAKS ICE JAM ON THE MOHAWK RIVER. Explosives Engr. 8:183-185 incl. illus. May 1930.
DLC, TP270.A1E8, v. 8

The breaking up of an unusually heavy ice formation to avoid flooding is described. The 30-ft. thick ice on the Mohawk River was packed 2 ft. above the lock walls and held back more than 7 ft. of flood water. Holes were bored through the ice with an auger and one 1.25 x 8-in. cartridge of 60% ammonia dynamite was dropped in each hole and drawn up against the bottom of the ice. A total of 2400 cartridges were used. The explosions opened a water channel 15 ft. wide. The 0.5-mi. long ice field floated downstream, restoring the normal water level of the river.

SIP U5865

Sukhodol'skiĭ, E. I.
CONSTRUCTION OF WOODEN BRIDGES IN THE NORTHERN REGIONS OF PERMAFROST. (Sooruzhenie derevĭannykh mostov v usloviĭakh severnykh raĭonov oblasti vechnoĭ merzloty; Text in Russian with English summary). Trudy Instituta Merzlotovedeniĭa im V. A. Obrucheva, 2:121-213 incl. illus. tables, graphs, diagrs. 1946. 12 refs.
DGS, 941(570)Ak12t2, v. 2

The results of a 2-yr. expedition of the Committee for the Study of Permafrost to the southwestern part of the Taimyr peninsula are presented. More than 100 km. of road were inspected, 80% of which was in light argillaceous loam with 3-5% of gravel and pebbles; 12% of the area was covered with peat. Average moisture was 27% and the depth of seasonal thawing 0.5-1.5 m. More than 50% of rivers and springs formed naleds. Tables, charts and photographs of 18 bridges are presented and classified according to the water conditions in winter. Bridges were observed shortly after completion to determine the causes of deformation. Deformations were vertical due to ground swelling, horizontal due to the action of naleds or due to a combination of both influences. Bridges were built on log supports, crib

piers, piles or stone buttresses. Passive methods, either the conservation of permafrost or the production of deep penetration, are recommended to control naleds and bridge support deformations. Instructions are given for calculating bridge spans and selecting bridge types.

SIP U5866

Ganovskiĭ, V.
ACADEMICIAN V. A. OBRUCHEV AND SOVIET PERMAFROSTOLOGY. (Akademik V. A. Obruchev i sovetskoe merzlotovedenie; Text in Russian). Izvestiâ Akademii Nauk SSSR, Seriâ Geologicheskaâ, No. 1:15-24, 1944. [140] refs.
DLC, AS262.A62465, 1944

Permafrost research of V. A. Obruchev from 1890-1943 is reviewed briefly. Scientific contributions, notes and popular writings of Obruchev and material published concerning his research are listed chronologically.

SIP U5867

Brooks, Charles F.
THE SNOWFALL OF THE UNITED STATES. Quart. J. Roy. Meteorological Soc. 39:81-86 incl. table, map, discussion, April 1913. 2 refs.
DLC, QC851.R8, v. 39

Early snowfall measurements are described, and snowfall data from 1884-1910 are tabulated. A snowfall map of the U. S. is presented, based on data collected by 159 stations from July 1895-June 1910. The records and map are criticized in that the altitudes at which heavy snowfalls occur were not included. More detailed observations on moisture loss through evaporation during melting in a heated gage are recommended. Snow, melting as it falls, reduces the amount of snow blown out of the funnel and increases the accuracy of the record.

SIP U5868

[Simpson, George C.]
ELECTRICITY OF RAIN AND SNOW. Quart. J. Roy. Meteorological Soc. 36:37-38, Jan. 1910.
DLC, QC851.R8, v. 36

Measurements of the electrification of rain and snow were made at Simla (India) from 1908-1909. It is concluded that more positive than negative electricity is brought down by snow, in the ratio of 3.6:1. Positively charged snow falls more often than negatively charged. The vertical electric currents during snowstorms are on the average larger than during rainfall. The charge per unit mass of precipitation is larger during snowfall than during rainfall.

SIP U5869

Haskin, Simon
ANTI-ICING IS SIMPLE... Aero Digest, 58, No. 5:58 incl. diagrs. May 1949.
DLC, TL501.A292, v. 58

Analysis of the airflow over an exposed surface in normal flight shows that water is carried away from areas subjected to a constant flow of air while it collects and freezes in areas corresponding to dead air spaces. A streamlined plate mounted across the leading edge of a wing to direct some airflow downward and over the normally stagnant area pushes any moisture present into the airstream and prevents icing. Perforated tubing installed ahead of any dead air space will prevent icing when a supply of air pumped through it is directed through the perforations on susceptible icing areas.

SIP U5870

Bassett, Curtiss D.
THERMO-ELECTRIC EFFECT FOR DE-ICING. Aero Digest, 58, No. 5:59-60, 100 incl. graphs, diagrs. May 1949. 5 refs.
DLC, TL501.A292, v. 58

A layer of ice formed on the lip of an intake duct or on the leading edge of the wing of an aircraft will restrict carburetor airflow reducing power, or alter the contour of the airfoil threatening stability. A thermoelectric method of melting the accumulated ice, based on the Peltier and Seebeck effects is described. One junction of a thermocouple heated at the exhaust stack produces an e.m.f. which transfers the heat to the iced areas. The amount of heat delivered to the cold junction with a given hot junction temperature is limited only by the design of the hot junction and the electrical resistance of the thermocouple. The temperature-voltage relationship of the C-SiC thermocouple is compared with that of other thermocouples. Forms for hot and cold junctions to protect an air intake are suggested.

SIP U5871

Dufour, L. and R. Defay
TEMPERATURES AT WHICH ICE CRYSTALS AND SALT WATER DROPLETS COEXIST IN THE ATMOSPHERE. (Températures de coexistence de cristaux de glace et de gouttes salées dans l'atmosphère; Text in French). Publications Série B, No. 5, Inst. Roy. Météorologique Belgique, 19p. incl. tables, diagrs. 1952.
DWB, Unbound periodical

Formulas are derived from which the coexistence temperature of salt water droplets and crystals may be calculated as a function of the solution strength, the respective crystal and droplet diam. and the atmospheric pressure. A droplet 10^{-4} cm. in radius may coexist in the air with a crystal of 10^{-5} cm. radius at a temperature of -1.5°C. The coexistence temperature varies with the radius of both droplet and crystal when both are suspended in the air but depends almost exclusively on the crystal radius when the crystal is entirely contained in the suspended droplet. A study of a crystal partly contained in the droplet shows that this type of crystallization is the most frequent.

SIP U5872

Oak, W. W. and H. V. Myers
ICE REPORTING ON THE GREAT LAKES. Weatherwise, 6, No. 1:7-10 incl. illus. table, graphs, Feb. 1953.
DWB, M(05)W362

Nearly 50 yr. of weather bureau records were examined to correlate preceding winter temperatures with subsequent spring opening dates. A significant correlation was obtained by using a summation of Dec., Jan., and Feb. mean temperatures but the best results are obtained by using Feb. temperatures alone. Forecast curves were obtained for several ports on the Great Lakes by plotting the number of days between Jan. 1 and the navigation opening against the Feb. mean temperature. The standard error of the estimated opening date of navigation varied from 8 days at Cleveland to 13 days at Duluth. The earliest and latest opening dates for 8 ports are given.

SIP U5873

Itoo, K.
SIZE, MASS AND SOME OTHER PROPERTIES OF ICE CRYSTALS IN THE AIR. Papers Meteorol. Geophys. (Japan), 3:297-306 incl. illus. tables, graphs, diagrs. March 1953. 3 refs.
DWB, Unbound periodical

Microphotographs of ice crystals in the air were taken. The average length of the principal axis for 234 hexagonal twin prisms is 83 μ and the auxiliary axis 53.5 μ, with a mean ratio of 1.6. Measurements of 94 hexagonal plate crystals give an average diam. of 100.5 μ, an average thickness of 30 μ, and a mean axes ratio of 0.8 or half that for the prism. The mean mass of hexagonal twin prisms is 0.141×10^{-6} gm. and that of hexagonal plate crystals 0.135×10^{-6} gm. or about 0.03 of that of snow. Ice crystals in the air formed under similar atmospheric conditions are similar in size and shape. Adherence of ice crystals to one another occurs at the edges. Sublimation, which starts at the moment the crystal is formed, begins at the edges.

SIP U5874

Aliverti, G.
THE PHENOMENA OF ABLATION AND TONGUE MOVEMENTS ON THE LYS GLACIER. (Sopra i fenomeni di ablazione e di movimento sulla lingua del ghiacciaio del Lys; Text in Italian with English summary). Boll. Comitato Glaciol. Ital. ser. 2, 3:17-23 incl. illus. 1952. 2 refs.
DGS, 250(550)qC73, No. 3

Ice cones and mounds near or at the margins of a meltwater stream were observed on the Lys Glacier during Aug. 1951. Modifications in the position of the ice cones and changes in the depth and relief of the stream bed occurred between 1950 and 1951. The ice at the left glacier margin had thinned as compared to the ice observed in 1950. The observations indicate that ablation effects and glacier movement modify the glacier shape rather rapidly during the summer months. Regular stereophotogrammetric measurements of certain glacier sections are recommended.

SIP U5875

Morandini, Giuseppe
REPORT ON DENSITY AND TEMPERATURE STUDIES CONDUCTED IN THE SNOW COVER, SPONSORED BY THE COMMISSION FOR SNOW OF THE ITALIAN GLACIOLOGICAL COMMITTEE. (Relazione sugli studi di densita' e temperatura del manto nevoso a cura della Commissione per la Neve del Comitato Glaciologico Italiano; Text in Italian). Boll. Comitato Glaciol. Ital. ser. 2, 3:77-89, 1952. 4 refs.
DGS, 250(550)qC73, No. 3

A review of recent Italian snow studies is presented. Ten stations for the study of snow thickness, snow density and air temperatures were established at elevations ranging from 1410-2164 m. Snow samples were taken horizontally in trenches at a maximum distance of 50 cm. Observations were made at northern and southern exposures, and in the same area but subjected to different winds. Snow profile studies indicated the presence of different snow strata of varying densities. Snow densities measured in March increased at an irregular rate from higher to lower elevations. Regular, bi-weekly observations are recommended to determine whether snow density changes are caused by temporary snow cover modifications or by temperature conditions over the whole winter. Snow temperatures measured with a geothermometer were close to 0°C at the surface and at deeper, but measurements with electric thermometers are recommended for higher reliability.

SIP U5876

Angius, Ermete
REPORT ON RESEARCH DONE ON THE SNOW COVER AT THE STATION OF THE DELLA ROSSA LAKE FROM OCT. 1951-JUNE 1952. (Relazione sulle ricerche eseguite sul manto nevoso presso la stazione nivometrica del Lago Della Rossa; Text in Italian). Boll. Comitato Glaciol. Ital. ser. 2, 3:197-206 incl. illus. tables, diagrs. 1952.
DGS, 250(550)qC73, No. 3

The basin of the water reservoir is described. Over 3.50 m. of snow fell at the Lago della Rossa in Nov. 1951, with a maximum snow cover thickness of 2.40 m. on Nov. 20. An east-west trench, 2 m. long and 1 m. wide, was dug into the snow cover before each snow density measurement. The northern wall was used for taking horizontal snow samples with a snow sampler. The samples were weighed and the density calculated. Air temperatures were taken at the beginning and end of each operation. Mean densities ranged from 0.344 on Dec. 1 to 0.44 on June 13. Densities increased irregularly with depth due to water infiltration. Snow cover and precipitation curves, mean density values, and water

content of the snow cover of the Lago della Rossa for the winter 1951-52 are graphically presented. The snow-cover thickness increases with increasing precipitation at temperatures below 0°C, diminishes with decreasing snowfall and with rain. Theoretical calculations are made to study the possibility of determining the water supply of the whole basin on the basis of the values obtained in one point of the snow cover.

SIP U5877

Nangeroni, Giuseppe
REPORT ON RESEARCH ON THE SNOW CONDITIONS IN THE REGION OF THE SPLUGA FROM OCT. 1951 TO THE SUMMER OF 1952. (Relazione della richerche eseguite sulle condizione nivali nella regione della Spluga dall'ottobre 1951 all'estate 1952; Text in Italian). Boll. Comitato Glaciol. Ital. ser. 2, 3:237-244 incl. tables, graphs, diagrs. 1952.
DGS, 250(550)qC73, No. 3

Snowfall during the observation period totaled 455 cm., with a minimum of 23 cm. in Oct. and a maximum of 115 cm. in Nov. The maximum snow-cover thickness was 2.30 m. on April 4; the snow cover disappeared on May 17. The specific gravity of snow close to the ground ranged from 0.414-0.551 independent of seasonal changes; the specific gravity of the surface layer ranged from 0.205-0.392. Specific gravity decreased from the bottom towards the upper layers independent of the snow cover thickness. Snow in contact with the soil maintained above-freezing temperatures; surface snow temperatures were influenced by air temperatures. It is believed that in general surface snow temperatures are higher than the corresponding low air temperatures, and lower than the corresponding high or moderate air temperatures. Snow temperatures usually increase with increased depth.

SIP U5878

Vanni, Manfredo
REPORT ON THE OBSERVATIONS MADE DURING THE PERIOD NOV. 1951-MAY 1952 ON THE SNOW COVER OF THE HIGH BASIN OF VALTOURNANCHE. (Relazione delle esservazioni eseguite nel periodo Novembre 1951-Maggio 1952 sul manto nevoso nell'Alto Bacino della Valtournanche; Text in Italian). Boll. Comitato Glaciol. Ital. ser. 2, 3:207-236 incl. illus. tables, map, diagrs. 1952. 4 refs.
DGS, 250(550)qC73, No. 3

Five snow survey stations were established in the basin of Valtournanche at elevations from 1850-2900 m. to study snow-cover formation and the relationships between the conditions of the snow cover and the run-off of the Alpine water sources. The basin has an annual snowfall from 1100-1800 mm., low temperatures and a long snow cover duration. The larger part of the basin area is located between 2400 and 3200 m. elevation and comprises the lower glacier ablation areas and the temporary snow cover influencing the flow of the Marmore stream. Monthly snow cover thickness, density and run-off of the Marmore stream are presented. An analysis of these values indicates increasing snow density during the winter with a maximum of 0.446 at the ground in May and a surface density of 0.550 at 2900 m. elevation at the beginning of June. The highest water reserve existed at the end of March (12.05 million cu. m.). Snow-cover thickness increased regularly from Nov.-March. Church's theory establishing 4 snow types according to density is reviewed. Other factors influencing snow density include age of the snow, soil conditions, topography, vegetation and solar radiation. Snow temperatures vary widely within short intervals of time and space.

SIP U5879

Vanni, M.
THE SNOW COVER OF THE HIGH BASIN OF VALTOURNANCHE AND THE RUN-OFF OF THE MARMORE STREAM. (Il manto nevoso nel bacino dell'Alta Valtournanche ed il deflusso del torrente Marmore; Text in Italian with English summary). Boll. Comitato Glaciol. Ital. ser. 2, 3:65-75 incl. illus. tables, map, diagrs. 1952. 3 refs.
DGS, 250(550)qC73, No. 3, ser. 2

Meteorological data from Goillet (2600 m.) and Perrerès (1850 m.) from 1944-1952 were examined for possible relationships between the snow cover of the Valtournanche basin and the run-off of the Marmore stream. Mean snow-cover duration, mean monthly run-off and May run-offs with corresponding April snow-cover thicknesses, dates of disappearance of the snow cover and mean May air temperatures are tabulated. Heavy winter snowfalls are followed by low medium temperatures and a short ablation period in spring and summer; winters with scant snowfall are followed by higher medium temperatures and a longer and more intense ablation period in the spring and summer. The run-off of the Marmore stream is not greatly influenced by the snow cover thickness, due to the modifying effect of spring and summer temperatures and glacier ablation.

SIP U5880

Itō, Kiōji
A NOTE ON DIAMOND DUSTS. (Saihyō no kiroku ni tsuite no chūi; Text in Japanese with English summary). J. Meteorological Soc. Japan, 29:311-313 incl. table, Sept. 1951.
DLC, Orientalia Div.

Terms given to ice crystals occurring in the free atmosphere are chronologically arranged for the period 1681-1951. The definitions for various types are classified.

SIP U5881

Schaefer, Vincent J.
FINAL REPORT. PROJECT CIRRUS. PART I. LABORATORY, FIELD, AND FLIGHT EXPERIMENTS. Rept. No. RL-785. General Electric Research Laboratory, 170p. incl. illus. tables, graphs, maps, diagrs. March 1953. (Contract No. DA-36-039-sc-15345)
ASTIA, AD11026

The historical background of Project Cirrus is reviewed. The results of 5 yr. of laboratory, field, and flight research in cloud physics and experimental meteorology are summarized. Results indicate that supercooled clouds may be effectively modified by dry ice and/or AgI seeding; a concentration of 5×10^7 ice nuclei/cu. m. is necessary to change a supercooled cloud to snow within a min., and that most foreign-particle ice nuclei are of volcanic origin. Conclusions relative to cloud seeding techniques and recommendations for further research are given.

SIP U5882

Algren, A. B.
GROUND TEMPERATURES AS AFFECTED BY WEATHER CONDITIONS. Heating, Piping & Air Conditioning, 21, No. 6:111-116 incl. tables, graphs, diagrs. June 1949. 1 ref.
DLC, TH7201.H45, v. 21

Soil temperatures to a depth of 16 ft. were measured by thermocouples over a 2-yr. period. An analysis of the conductivity tests indicates that at a constant moisture content, the thermal conductivity of silt and clay soils increases with an increase in dry density at a constant rate, independent of the moisture content. The thermal conductivity increases at a constant dry density with an increase in moisture content; in unfrozen soils it increases with an increase in mean temperature. The heat conductivity of frozen soil at low moisture content varies little, but increases in soils of high moisture content with a decrease in temperature.

SIP U5883

Bader, Henri
SORGE'S LAW OF DENSIFICATION OF SNOW ON HIGH POLAR GLACIERS. Res. Paper No. 2, Snow, Ice and Permafrost Research Establishment, 3p. incl. table, graph, [1953]. 2 refs.
SIPRE files

The density of snow at any given depth does not change with time at Eismitte (Greenland) because summer melting does not occur. The load of the overlying snow at any depth is equal to the density integrated over the depth. The time required for a snow particle to reach any depth is equal to the load divided by the accumulation in unit time. The vertical velocity is equal to the accumulation in unit time divided by the density. A formula for the specific velocity of densification is also derived. The measurements of density, weight of overlying snow, time elapsed since deposition, the vertical velocity and the rate of densification of the snow observed at Eismitte by Sorge for a depth of 15 m. accumulated over a period of 22 years show good correlation with the calculated values.

SIP U5884

Carsley, A. D.
BLASTING RIVER ICE IN MICHIGAN...Explosives Engr. 25:144-146, 152 incl. illus. map, diagrs. Sept.-Oct. 1947.
DLC, TP270.A1E8, v. 25

The 80-ft. wide Sebewaing River is covered with ice 2-3 ft. thick in winter which damages bridges and causes floods in the spring. Cartridges (50% nitroglycerine dynamite) were tied in 20-in. intervals, inserted under the ice with a 40-ft. running pole, and connected to a blasting machine. The broken ice was carried by the stream into the Saginaw Bay. This method was modified to remove ice under a railroad bridge by placing additional charges around the concrete pier in the center of the bridge, about 3 ft. from the pier.

SIP U5885

Cherevatskiĭ, M. L.
CONSTRUCTION OF DITCHES FOR WATER-SUPPLY AND CANALIZATION LINES IN WINTER. (Stroitel'stvo vneshnikh setel vodoprovoda i kanalizafsii v zimnee vremîa; Text in Russian). Sbornik materialov o novoĭ tekhnike i perevodom opyte v stroitel'stve, 15, No. 4:9-12 incl. diagrs. 1953.
DLC, Slavic unclassified

The excavation of frozen ground and tests of water supply lines in winter are described. Frozen ground is excavated by explosives, steam jets, and battering-rams depending on the depth of frost penetration and width of excavations. The most frequent technique consists of a battering-ram weighing 1000-1200 kg. being dropped from a height of 5-6 m. at 50-60 cm. intervals. Pipes were welded in portable huts at air temperatures of -30°C. Cast iron pipe joints were beaded using a dry snow-asbestos-cement mixture. The snow melts gradually and reacts with the cement on heating. Pipes were tested for defects with NH_4OH and the escape of NH_3 was detected with a phenolphthalein solution.

SIP U5886

Sitnik, A. F.
A NEW METHOD FOR DETERMINING THE DEPTH OF SOIL FREEZING AND THAWING. (Novyĭ metod opredeleniîa glubiny promerzaniîa i ottaivaniîa pochvy; Text in Russian). Sovetskaîa Agronomiîa, 9, No. 10:87-89 incl. diagrs. 1951.
DLC, S13.S88, v. 9

A rubber tube 115 cm. long and 1 cm. in diam. filled with water was used for measuring the depth

of soil freezing. The tube is placed in a hole 120 cm. deep and 4-5 cm. in diam. An ebonite pipe 50 cm. long is placed in the upper part of the hole and covered with a metallic disc. Thin wires are submerged in the water to prevent the ice from rising to the top. Measurements are made by finger pressure on the tube. Good comparison with measurements by boring were obtained.

SIP U5887

Langmuir, Irving
FINAL REPORT. PROJECT CIRRUS. PART II. ANALYSIS OF THE EFFECTS OF PERIODIC SEEDING OF THE ATMOSPHERE WITH SILVER IODIDE. (Rept. No. RL-785, General Electric Research Laboratory, 336p. incl. tables, graphs, maps, diagrs. May 1953. (Contract No. DA-36-039-sc-15345)
ASTIA, AD11027

Two lb. of AgI/week were dispersed as a smoke from a ground-based generator in N. Mex. to introduce a 7-day periodicity into the rainfall over large areas. Profound periodic changes in weather were noted, the average rainfall being 3-10 times as large on Mon. or Tues. as on Sat. or Sun. The onset of these periodic changes occurred within 2 weeks after the start of periodic seeding and ended within 2 weeks after the periodic seeding stopped. It is believed possible to modify at low cost and to control within limits the general synoptic weather patterns over whole continents.

SIP U5888

Riznichenko, IU. V.
SEISMIC PROPERTIES OF PERMAFROST. (O seĭsmicheskikh svoĭstvakh sloĭa vechnoĭ merzloty; Text in Russian). Izvestiĭa Akademii Nauk SSSR, Seriĭa Geograficheskaĭa i Geofizicheskaĭa, 6:263-274 incl. graphs, 1942. 13 refs.
DLC, AS262.A6246, v. 6

Investigations made during 1940 in the arctic showed that the reflecting method may be applied in permafrost regions. Observations indicated that permafrost layers are characterized by seismic homogeneity and minimum absorption. The presence of permafrost necessitated the use of some special procedures in seismic observations.

SIP U5889

[Almöf, Erik, Ovar Carlsson and Erik Selén]
A DISCUSSION CONCERNING RESISTANCE OF DRAIN TILES AGAINST FROST IN THE GROUND. (Diskussionsinnlägg angående tegelrörs frostbeständighet i marken; Text in Swedish). Grundförbättring, 6:55-58, 1953.
DLC, Unbound periodical

Almöf believes that Carlsson's experiments concerning frost resistance of ceramics supported the theory that tiles are not damaged by freezing if proper drainage existed. Carlsson suggests that tiles break when exposed to frequent fluctuations above and below 0°C in the ground. Selén observed that exposure of the tiles to moisture favored freezing damages which might come from water still remaining in the drains. Tiles placed directly on the ground chipped, but remained whole when placed on wood and covered. It is suggested that freezing resistance is reduced proportionally with increased thickness of the walls of the drainpipes. (See also SIP U5646)

SIP U5890

Smirnov, G. S.
SNOW RETENTION. (O snegozaderzhanii; Text in Russian). Sovetskaĭa Agronomiĭa, 11, No. 1:80-81, 1953.
DLC, S13.S88, v. 11

Snow fences (100 x 200 cm.) were arranged in a checkered pattern before the winter of 1951-52 for snow retention in a 40-ha. farm in the Ilek region (Chkalov province). The mean maximum depth of the snow cover in snow retention areas was 62 cm. as compared to 49 cm. in regions without a snow retention plan. Snow melting continued 3-4 days longer in retention areas permitting complete absorption of all the meltwater by the soil. Snow fences in some regions of the southeast cannot be obtained because of wood shortage. Snow retention by snowplowing is feasible in these areas.

SIP U5891

Ianovskiĭ, D. M.
A NEW SNOWPLOW. (Novyĭ snegopakh; Text in Russian). Sovetskaĭa Agronomiĭa, 11, No. 1:81-83 incl. diagr. 1953.
DLC, S13.S88, v. 11

A new device to aid in snow retention practices in agricultural areas is described. Snow is collected through the open, front part of the plow (3-3.5 m. wide) and compacted into ridges 0.8 m. wide. The device is pulled by a tractor and travels on runners 12-13 cm. high to retain some snow cover over the cultivated area.

SIP U5892

Zhukov, V. F.
SNOWSTORM ROSES. (Rozy purg; Text in Russian with English summary). Izvestiĭa Akademii Nauk SSSR, Seriĭa Geograficheskaĭa i Geofizicheskaĭa, 8:128-132 incl. illus. table, diagrs. 1944.
DLC, AS262.A6246, v. 8

The quantity of snow deposited by snowstorms depends on the aerodynamic characteristics of roads, buildings, forests and wind velocity. Observations made by the Vorkuta Permafrostology Station showed that the configurations of snow deposits around a building remain constant for several winters. Snowdrifting occurs in the Vorkuta region

during the first half of winter with wind speeds of 7 m./sec. and higher. During the second half of winter, drifting occurs with wind speeds as low as 6 m./sec. These values may be applied to other regions of the European tundra zone but not to other parts of USSR due to varying physical properties of the snow.

SIP U5893

Gorodkov, B. N.
SOILS OF GYDA-IAM TUNDRA. (Pochvy Gydanskoĭ tundry; Text in Russian). Akademiîa Nauk SSSR, Trudy Polîarnoĭ Kommissii, 7:1-78 incl. illus. tables, map, diagrs. 1932. [85] refs.
DLC, G600.A4, v. 7

Tundra soil from 71°-77°N. lat. in the USSR was investigated. Spotted tundra in this region results from low temperatures, scant snow and vegetative cover, and strong winter winds. The deepest active layer (90 cm.) occurred in clayey soil in autumn. Frost penetrated to a depth of 40-50 cm. under moss tundra and to 30 cm. under dry peat-soil tundra. The snow cover was 10-50 cm. high depending on the relief. Tables are given indicating air and surface soil temperatures and soil temperatures at 5 to 10-cm. intervals to the permafrost table in dry and moist spotted tundra, peat moss, sandy and heavy clay, with and without snow and brushwood cover.

SIP U5894

Maksimovich, G. A.
THE POROSITY OF THE CRYOSPHERE. (Poristost kriosfery; Text in Russian). Doklady Akademii Nauk SSSR, 51, No. 2:115-118 incl. tables, 1946. 23 refs.
DLC, AS262.S3663, v. 51

The cryosphere constitutes approximately 3.5 million cu. km. of polar ice and snow. The estimated volume of the seasonal cryosphere (largely snow) is 250 cu. km. The cryosphere varies markedly in porosity depending on the density of the snow. For snow densities ranging from 0.14-0.50, the porosity decreases from 92.5-45.5% and averages 75%. Porosity of firn ice varies from 30-40%, icebergs 7-15%, and glacier ice 1-4%: Porosity of sea ice in the Gulf of Finland was found to be 4%, in the Barents Sea 8%, with an average of 3%. The porosity of permafrost is very small.

SIP U5895

Calciati, Mario
DRILLING ON THE HOSAND GLACIER. (Le perforazioni eseguite del ghiacciaio d'Hosand; Text in Italian). Boll. Comitato Glaciol. Ital. 23:19-26 incl. illus. map, diagr. 1945; Appendix by C. Somigliana, p.26-28. 3 refs.
DGS, 250(550)qC73, No. 23:1945

The depth of the glacier was determined by drilling to bedrock with a hollow drilling rod through which hot water is circulated. The water is pumped from a boiler into a double tube in the rod and returns to the boiler for reheating. Boring speeds range from 4-10 m./hr. according to the impurities encountered in the ice. The disadvantage of delay by large soil clods is overcome by rapid advancement through pure ice. The glacier depth determined by the borings confirmed the validity of the Somigliana formula by which the glacier depth is calculated as a function of the surface velocity, inclination and dimensions of the glacier. It is believed that the Somigliana formula may be applied for determining the depth of all glaciers with few crevices. Highly accurate results were obtained for the lower sections where the glacier surface is practically horizontal to the bottom plain. Approximate results were obtained for areas close to the summit by introducing the value for the surface inclination.

SIP U5896

Aliverti, G.
THE PHYSICAL STRUCTURE OF THE GLACIER AND THE PROPERTIES OF GLACIER FLOW. (La struttura fisica del ghiacciaio e le modalità del movimento di discesa; Text in Italian). Boll. Comitato Glaciol. Ital. 23:7-18 incl. illus. 1945.
DGS, 250(550)qC73, No. 23:1945

The physical structure of the Lys Glacier is discussed in terms of glacier dynamics. The leaf-shaped stratifications of the glacier tongue were believed to originate from the accumulation basin and to have moved downward to the tongue. Later hypotheses include the theory by Philipp which assumes that the stratifications were caused by tangential tensions. The inclination of the ice veins was measured with a plumb line. Leafy stratifications consisting of alternate layers of compact and porous ice were also observed in crevices.

SIP U5897

Peretti, Luigi
THE CLIMATIC LIMIT OF PERMANENT SNOW IN THE WEST ITALIAN ALPS. (Il limite climatico delle nevi permanenti nelle Alpi Occidentali Italiane; Text in Italian). Boll. Comitato Glaciol. Ital. 11: 151-187 incl. tables, map, 1931. 18 refs.
DLC, QE576.C6, v. 11

The climatic snow limit is defined as the mean elevation above which the annual snow accumulation is never completely eliminated by ablation. The orographic lines separating accumulation and ablation areas vary within cycles of years and correspond to the mean elevation of the glacier. Indirect methods established by L. Kurowski and V. Monti for determining the mean glacier height are discussed. The regional climatic snow limit may be determined by measuring the influence of orographic factors on accumulation and ablation. Factors influencing accumulation include snow precipitation, shape of the collection basin, elevation and orientation of the surrounding mountains, and condensation; factors influencing ablation include insolation, rain, surface inclination, and heat radiation of the bare rocks and crevasses. Symbols for the 15 factors influenc-

ing ablation and accumulation are presented and 13 orographic mountain groups on the Italian slope of the northern Alps are analyzed. The climatic snow limits are calculated and discussed. It is concluded that the climatic snow limit is more closely related to the altitude than to the location of the glacier within the Alpine chain. The climatic snow limit has risen from 30-60 m. as compared with the latter part of the past century.

SIP U5898

Camoletto, Carlo Felice
THE PERIODICAL VARIATIONS OF THE GLACIERS OF THE MARITIME ALPS. (Le variazioni periodiche dei Ghiacciai delle Alpi Marittime; Text in Italian). Boll. Comitato Glaciol. Ital. 11:189-212 incl. illus. tables, graphs, maps, 1931. 3 refs.
DLC, QE576.C6, v. 11

Glaciers in the Maritime Alps were in a stage of extreme recession both in 1893 and 1930. A gradual advancement took place between these dates until 1911-12, and a subsequent regular recession from 1912-30. This 35-yr. cycle may be subdivided into 3 periods: a scant development from 1893-1906, a maximum accumulation from 1906-1918, and a distinct recession from 1918-1930. This cycle confirms the theory of an 11-yr. glacier oscillation. Records of mean maximum temperatures, precipitation and fogginess for these 3 periods indicate that the glacier variations were determined mostly by temperature variations. The vertical and horizontal fluctuations of 4 glaciers are graphically presented and interpreted. Ablation values measured on the Maledia Glacier in Aug. and Sept. were in good agreement with those calculated on the basis of mean day and night temperatures. The single glacier groups of the Maritime Alps are described and results of oscillation measurements presented. A trend toward a general increase of the glacier masses and a slight, but general advancement are observed in 1930, though precipitation at higher elevation was scant.

SIP U5899

Somigliana, C.
ON THE THEORY OF GLACIER MOVEMENT. (Sulla teoria del movimento glaciale; Text in Italian). Boll. Comitato Glaciol. Ital. 11:25-36 incl. diagr. 1931. 5 refs.
DLC, QE576.C6, v. 11

The problem of glacial movement considered as flow of a viscous fluid is formulated under the assumption that the vorticity is perpendicular to the velocity of the downward flow of glacier ice. This assumption is a generalization of the one-dimensional solution previously obtained by Somigliana. Kinematic and dynamic problems and the application of the theory to special cases are discussed.

SIP U5900

Lebedev, A. F.
SOIL AND GROUND WATERS. (Pochvennye i gruntovye vody; Text in Russian). Moscow-Leningrad, Izd-vo Akademii Nauk SSSR, 1936, 314p. illus. tables, diagrs. [60] refs.
DLC, GB1003.L4, 1936

Old and new theories of ground water formation are summarized and discussed. The laws of free, oriented and bound water migration in the soil both up and down are discussed. Problems of soil moisture accumulation and the role of evaporation and condensation of water in the formation of ground ice in permafrost are explained. The soil composed of solid or loose rock strata, frozen or unfrozen, is always porous to water vapor to a certain degree. Water condensing in permafrost in the form of ice layers comes from lower strata where vapor pressure is greater.

SIP U5901

Yosida, Zyungo and others
MECHANICAL PROPERTIES OF DEPOSITED SNOW. Japan Sci. Rev. 2:279-285 incl. illus. graphs, April 1952.
DLC, Unbound periodical

The results of 5 yr. of investigations of the mechanical properties of snow are presented. The ice crystals, composing deposited snow, change their forms within a few days without melting. Metamorphism occurs by evaporation and condensation of water vapor on their surfaces. Ice crystals retain the direction of their crystal axis during metamorphism. Deposited snow behaves as an ideal elastic body when stressed for a few seconds and as an ideal viscous liquid when stressed for an hour or more. A load deposited on a snow layer sinks to a certain depth and the uncompressed snow around it holds the load by reversible elastic strains distributed throughout it. The force exerted on snow during its breakdown by a falling object varies with the type of snow. The total resistance on a snow-sledge consists of the force with which the sledge pushes its way through the snow and the sliding resistance between the sledge and the snow, the former one being constant. The ice bridges connecting snow crystals do not break when snow flows under the influence of lasting pressure, but are deformed, displacing and rotating the ice crystals. The velocity of flow decreases with decreasing temperatures.

SIP U5902

Kamei, S. and others
RESEARCH ON THE FROST IN A LOW TEMPERATURE COOLER CONDENSER. Japan. Sci. Rev. 2:317-326 incl. illus. graphs, April 1952. 5 refs.
DLC, Unbound periodical

A low temperature cooler condenser is described. $CaCl_2$ brine at a temperature of -30° to -40°C cir-

culates through an inner tube surrounded by an outer tube in which cool air is allowed to flow. Air and brine flow are controlled by valves. Water vapor in the circulating air condenses and freezes on the outer surface of the cooling tube forming a frost layer. This layer grows with time while its density increases parabolically. Experiments were conducted at constant humidity, cold surface temperature, and air temperature with airflow rates of 65, 80, 160 kg./hr. The thickness of the frost layer does not vary, its density increases, and its thermal resistance decreases with increasing airflow. The surface temperature of the frost layer increases with time until it reaches 0°C, then remains constant. Formulas for the heat transfer coefficient, the temperature, and the water vapor transfer coefficient on the frost surface are derived. The relation between the water vapor transfer and the heat transfer coefficients is plotted. An equation for the effective film thickness for water vapor diffusion on the frost surface is presented.

SIP U5903

Wallén, Axel
CLIMATE OF SWEDEN. No. 279, Statens Meteorologisk-Hydrografiska Anstalt, 65p. incl. tables, graphs, maps, 1930.
DLC, QC852.S86, No. 279

The history, topography, forest cover, geology and drainage of Sweden are mapped. Detailed maps related to temperature conditions are presented. Maps giving the periods for the formation of ice on small lakes show that ice forms first in the interior of Norrland and later in the western mountain districts and along the coast. The lines showing the formation of ice in Central Sweden run in a west-east direction parallel to the isotherms. Ice melting dates are determined by the ice thickness which varies with the cold of winter. Ice breakup sets in latest in the western Upland regions. Ice on the smaller lakes lasts about 115 days in the south and over 200 in the north. The ice conditions in the seas surrounding Sweden are discussed. The percentage of precipitation occurring as snow is mapped and varies from 70% in the north to 10% in the south. The number of days with snow covering varies from 254 at Riksgränsen in the north to 34 at Lund in the south. Maps on river discharge, water power resources, atmospheric pressure, and wind are also included.

SIP U5904

Kolupaila, Steponas
OUR EXPERIENCES IN CALCULATING WINTER RUN-OFF. (Unsere Erfahrungen bei der Berechnung des Winterabflusses; Text in German). Hydrologische Konferenz der Baltischen Staaten, 5, No. 7C: 1-7 incl. tables, graphs, June 1936. 6 refs.
DLC, GB651.H8, v. 5

Winter discharge of Latvian rivers is calculated by plotting the curve representing the relationship between water measured directly and that determined by the summer water curve; by interpolating the reduction coefficient for each winter day and multiplying it with the summer water quantity corresponding with the water level. Measurement results of the Nemunas River from 1925-1934 are tabulated and the curves for the reduction coefficients plotted. Stream flow is reduced in southerly-flowing streams whenever a thick ice cover in the upper reaches restricts the free flow of water.

SIP U5905

Altberg, W. J.
RIVER ICE AND WINTER REGIME. (Flusseis und Winterregime; Text in German). Hydrologische Konferenz der Baltischen Staaten, 5, No. 7D:1-27 incl. illus. tables, diagrs. June 1936. 19 refs.
DLC, GB651.H8, v. 5

Extensive anchor-ice formation in the Neva River causes blocking and rising of the water to 3 m. above the normal level. A systematic investigation of the causes and countermeasures included the artificial freezing of part of the river. Slush responsible for ice blockings at Leningrad originated from the Ivanovo cataracts and from surface ice masses. A barrier across the river was constructed which reduced the flow, caused the freezing of the cataracts and retained 100,000 cu. m. of slush. Roentgen analysis and the Raman effect are discussed in the light of primary ice-crystal formation on condensation nuclei and solid bodies. The structural similarity of crystals and supercooled water and the anisothropy of the boundaries of the liquid in contact with a solid body indicate that freezing starts at the boundaries and that impurities in the water are essential for its freezing. The absorption of heat of crystallization by the water induces continued crystal growth as long as the water is kept supercooled. The calorimetric method for forecasting river ice formation is discussed.

SIP U5906

Chernyshev, M.
WATER SUPPLY LINE IN A PERMAFROST REGION. (Vodoprovody v raĭonakh vechnoĭ merzloty; Text in Russian). Stroitel'naîa Promyshlennost', 6, No. 10:721-723 incl. tables, diagrs. 1928. 3 refs.
DLC, TH4.S85, v. 6

Heat losses from water pipes in frozen ground with sand insulation were studied experimentally on 2 railroad water supply installations in eastern Siberia. Air and soil temperatures at depths from 0.40 - 3.20 m. were measured during the yr. The permafrost temperature at a depth of 3 m. varied from -3.5° to -5.5°C. Heat losses varied from 19.7-423 cal./sq. m./hr. Factors affecting heat loss include pipe length, flow velocity, heat conductivity of the ground, and difference of water-ground temperature. These complex relations are not expressed mathematically.

SIP U5907

Kalitin, N. N.
DIFFUSE RADIATION OF THE ATMOSPHERE IN THE ARCTIC. (Rasseſannaſa radiaſaſa atmosfery v usloviſakh Arktiki; Text in Russian with French summary). Izvestiſa Akademii Nauk SSSR, Seriſa Geograficheskaſa i Geofizicheskaſa, 2:129-147 incl. tables, graphs, 1938. 3 refs.
DLC, AS262.A6246, v. 2

Actinometric observations at Calm Bay, Uedinenie Island and Cape Shmidt during 1934-1937 indicated increased diffuse radiation as compared with the data at Slutsk. A greater condensation turbidity during clear days and lower cloud density during cloudy days may produce such increased radiation. An arctic snow cover of about 10 months also increases the value of diffuse radiation particularly when the sun is low on the horizon. Observations at Slutsk under clear skies showed that snow increases diffuse radiation from 65% when the sun is near the horizon to 11% when the sun is in the 55° position. Snow in the presence of dense clouds also increases diffuse radiation.

SIP U5908

Saether, H.
SAND SPREADING. (Sandstrøing; Text in Norwegian). Medd. Vegdirektøren, No. 6:89-90 incl. illus. diagrs. June 1949.
DLC, Unbound periodical

A simple sand spreading device is described. A 2 x 2-m. wooden form is fastened at the end of the truck platform, one end riding on 3 iron runners on the road surface. A 1 to 1.5-in. slot cut across the board allows the sand to flow evenly behind trucks operating at 40 km./hr.

SIP U5909

Kaitera, Pennti
EVALUATION OF FLOOD WATER QUANTITIES IN RELATION TO PROPOSED DRAINAGE PROGRAM IN FINLAND. (Om uppskattning av høgvattensmängder vid projektering av tørrläggingsføretag i Finland; Text in Swedish). Grundförbättring, 6:13-27 incl. tables, graphs, maps, 1953. 9 refs.
DLC, Unbound periodical

Snow melt and run-off are discussed in relation to proposed drainage programs to lessen the annual flood damage in Finland. The maximum snow depths (1892-1941) converted into water equivalents for thinly wooded areas in different parts of the country are mapped. Observational results of the rate of spring melt throughout the country show that about half of the snow fields melts within 5 days of the 30-day melting period. Curves representing the relative melt values for different terrain types, for dense and thinly wooded areas and cultivated land, show insignificant differences. The melting rate for the different parts of the country is proportional to the maximum water content of the snow cover in spring.

SIP U5910

Beskow, G.
FROST ACTION ON ROADS AND COUNTER-MEASURES. (Tjälbildningen i vägarna och åtgärder mot dess skadegörelse; Text in Swedish). p.292-345 incl. illus. tables, graphs, diagrs. (In: Teknisk-ekonomiska utredningar rörande vägvesendet, Svenska Väginstitutet, Medd. 44, 1934). 30 refs.
DLC, TE89.A5, 1934

The heaving effect of frozen soil depends on a steady water supply to the freezing layers. This process is controlled by size of the soil particles, capillarity and hygroscopy. The total amount of heaving is influenced by effective snow removal. Precautions against frost damage are discussed, and some methods for detecting frost-hazardous materials are included. Graphs indicating heaving rates in different soils, heaving as a function of depth of ground water, results on road profiles and other factors are given.

SIP U5911

Church, J. E., Jr.
PRESENT METHODS OF GLACIER STUDY IN THE SWISS ALPS. Monthly Weather Rev. (U. S.), 52: 264-266 incl. table, May 1924.
DLC, QC983.A2, v. 52

The Glacier Commission of the Physical Society of Zurich endeavors to determine the relation of the source of supply to the forward thrust and retraction of glaciers and to assess the evolution of the glacier snow below the surface. Mougin totalisers were used to determine total annual precipitation. Accumulation was determined by measuring the seasonal residue of snow upon the glaciers with buoys placed at each end of the Klariden Glacier and a Mt. Rose sampler to penetrate 5.5 m. through 2 seasonal accumulations. The total annual precipitation has far less relation to glacier growth than the snow residue from winter snows and summer melting. Comparisons of accumulation as indicated by the buoys and measurements with the sampler indicate that the lower strata decrease in depth with but little increase in density. Increase in velocity of glaciers with increasing temperatures is small compared to the velocity increase due to pressure. The center of the Mer de Glace (Switzerland) moves 0.5 ft./day in winter and 1 ft./day in summer, whereas glaciers in Greenland move from 20-60 ft. daily. Measurements obtained on Klariden Glacier between 1914-1921 are tabulated.

SIP U5912

Washburn, Edward W.
THE VAPOR PRESSURE OF ICE AND OF WATER BELOW THE FREEZING POINT. Monthly Weather Rev. (U. S.), 52:488-490 incl. tables, graph, Oct. 1924. 4 refs.
DLC, QC983.A2, v. 52

Available vapor pressure data on ice and supercooled

water are examined. Empirical data on ice are compared with calculated data. A good correlation exists between -20° and -100°C, wide deviations between 0° and -20°C. Experimental data in the latter region are rejected due to uncertainty in temperature measurements and it is assumed that the calculated values are correct. Values for the vapor pressure of supercooled water are obtained from the ice values by application of the second law of thermodynamics, and are tabulated from -16° to 0°C. Equations to transcribe the values of the vapor pressures of water and ice under their own vapor pressure into vapor pressures under atmospheric pressure are given.

SIP U5913

Bentley, Wilson A.
FORTY YEARS' STUDY OF SNOW CRYSTALS. Monthly Weather Rev. (U. S.), 52:530-532, illus. Nov. 1924.
DLC, QC983.A2, v. 52

The majority of the more perfect tabular snow crystals occur within the western quadrant of general storms or within regions of snowfall lying between 2 closely lying lows. The best crystals occur during medium or scanty snowfall with a barometric pressure of 29.7-30.2 in. Some 100-300 sets of photomicrographs were secured each winter except in the 1913-14 winter. The more unusual forms secured are described and related interesting phenomena are reported. The modifications of the crystals through progressive evaporation are discussed. Observations of water vapor crystallization in a room at 25°F show that all crystals forming under identical conditions are not alike.

SIP U5914

Cook, Albert W.
COMPARISON OF RAIN-GAGE CAN AND THE HORTON SNOW-BOARD MEASUREMENTS OF SNOWFALL AT GRAND FORKS, N. DAK. Monthly Weather Rev, (U. S.), 52:538-540 incl. tables, diagr. Nov. 1924. 1 ref.
DLC, QC983.A2, v. 52

The amount of snow caught in the gage-can never exceeded the amount caught on the board or other devices used to catch snow. It equaled it only in 2 cases during which the highest recorded wind velocities occurred. The mean of totals by standard rain-gage overflow can was 0.435 in. of melted snow, by Horton snow board 0.81 in., or a ratio of 1.86 from snow board to gage-can. The ratio of snow to melted snow varied throughout the winter from 7.5 -42 with an average of 14.

SIP U5915

[illegible]
DIELECTRICAL POLARIZATION IN THE SOLID STATE. (Dielektricheskaîa polîarizatsiîa v tverdom tele; Text in Russian). Zhurnal Eksperimental'noĭ i Teoreticheskoĭ Fiziki, 3, No. 1:16-30 incl. tables, graphs, 1933. 21 refs.
DLC, QC1.Z47, v. 3

Water passes through a colloidal state during freezing. This theory is supported by several observations. The mechanical properties of ice near 0°C are analogous to those of colloids. The dielectric constant drops from 88 in the liquid state at 0°C to 2.5 in the solid state at the same temperature. This variation of the dielectric constant is explained by the colloidal state of ice near 0°C.

SIP U5916

Zubov, N. N.
RATE OF ICE MELTING. (O skorosti taîaniîa l'dov; Text in Russian). Problemy Arktiki, No. 5: 13-18 incl. tables, 1940. 2 refs.
DLC, G600.P7, 1940

Incoming solar radiation and the heat capacity of water are the chief factors determining the melting of sea ice. The amount of heat absorbed by the upper ice surface is a variable value because melting reduces the albedo of fresh dry snow from 95% to 30%. The amount of heat absorbed also depends on air temperature, humidity, wind velocity, and some unknown factors. Heat absorbed by water induces melting because the albedo of the water is low and water circulates around melting ice. Suggested formulas and tables show that the water surface between melting ice increases in proportion to the square of the time. The mean value of heat absorbed by water was calculated as 300 gm. cal./sq. cm. based on empirical data obtained near the Kola Peninsula and northern Spitsbergen.

SIP U5917

Shpakovskaîa, R. N.
RADIATION BALANCE OF TIKSI BAY. (Radiatsionnyĭ balans bukhty Tiksi; Text in Russian). Problemy Arktiki, No. 6:28-39 incl. tables, diagrs. 1940. 2 refs.
DLC, G600.P7, 1940

Data of direct, diffuse and outgoing radiation at Tiksi Bay for 1935-1938 are tabulated and discussed. Albedo measurements were in good agreement with data from other polar stations. Albedo values ranging from 86% for months with fresh snow cover to 30% for summer months without snow were used to calculate the radiation balance. An albedo value of 80% was used during the snow-melting period. The radiation balance was negative for the region during Oct.-May. The total annual radiation balance was equal to an average of 1.38 kg. cal.

SIP U5918

Laktionov, A. F.
MEAN ICE LIMITS IN THE BARENTS SEA. (O srednikh krovkakh l'da Barentsova morîa; Text in Russian). Problemy Arktiki, No. 7-8:26, maps, 1940. 2 refs.
DLC, G600.P7, 1940

Data on arctic icing from 1898-1938 published by the Danish Meteorological Institute are mapped.

The extreme northern and southern, and mean location of the ice limit are shown for 1898-1920 and 1921-1938. The warming of the arctic observed from 1920 changed these limits considerably. The mean percentage of sea ice in the Barents Sea before the warming varied from 76% in April to 26% in Aug. After 1920 the average percentage was about 74% in April and diminished to 14% in Aug. The ice limit along 40°-50° E. long. moved northward 110-120 naut. mi. during the period of the arctic warming.

SIP U5919

Morandini, G. and R. Albertini
THE SNOW COVER CONDITIONS AT CARESER, CORTINA AND FEDAIA. (Le condizioni di innevamento al Careser, Cortina e Fedaia; Text in Italian). Boll. Comitato Glaciol. Ital. ser. 2, 3:245-271 incl. illus. tables, graphs, map, diagrs. 1952. 4 refs.
DGS, 250(550)qC73, No. 3

Snow cover studies were conducted in several stations established along the Alpine mountain chain in 1951-52. Snow density, snow-cover thickness, precipitation, air temperature, humidity, insolation, and fog data are recorded for elevations of 1200-1300, 1500-1600, 2000-2100, and 2600-2700 m. The mean density values measured at 4 points within each of the elevation zones from Oct.-April are tabulated. These values do not confirm the observations made by Morandini regarding the existence of a critical limit at about 1500-1600 m. which separates a lower zone with higher snow density from a higher zone with lower density, nor the theory that higher densities always correspond with lower elevations. The discrepancies observed are attributed to the influence of wind, insolation and heat transfer from the soil. Snow density increases continuously in the course of the winter. The density of the surface layer is influenced by new snowfall; the density of the layer at 40 to 50-cm. depths is representative for the total density curve and frequently corresponds with those of the bottom layer. Stations for studying the relationships between snow cover, density and run-off should be located so as to avoid influences from outside the basin under observation.

SIP U5920

Keränen, J. and V. V. Korhonen
CLIMATE. Fennia, 72:100-128 incl. tables, graphs, maps, 1952. 20 refs.
DLC, G23.G4, v. 72

Temperature conditions, winds and precipitation in Finland are described. Strong reflection and radiation of heat from the snow surface tend to intensify the cold. Radiation from the surface of fresh snow is 80-85%, from the surface of old snow 40-70% compared to 10-25% from bare ground. Snow represents 30% of the annual precipitation in the southwestern part and more than 40% in the inner and northern part. The first snow usually falls during the latter half of Sept. in Lapland, the beginning of Oct. in central Finland, the end of Oct. in southwestern Finland. The snow forms a continuous layer in the north by the end of Oct., in central Finland by the end of Nov., on the southwestern coast by late Dec. and on the Aland Islands by early Jan. The snow cover reaches a maximum depth by mid-March. The amount of water in the snow cover by mid-March is about 140 mm. in central Lapland, 125 mm. in central Finland and 50 mm. on the Archipelago. The snow cover disappears from the open country on the southwestern coast by April 10, in central Finland by the end of April, and in northwestern Lapland by the end of May.

SIP U5921

Jurva, Risto
SEAS. Fennia, 72:136-160 incl. graphs, maps, 1952. 12 refs.
DLC, G23.G4, v. 72

The water movements, basins, and ice conditions of the seas adjacent to Finland are described. The coastal and archipelagic ice is even ice; the open sea ice is sludge, pancake ice, or thin new glaze ice. Fast ice is thickest in the north and east ranging from 0.5-1 m. Drift ice may reach a thickness of 40-60 cm.; pack ice often has a thickness of several meters. Sea ice drifting against coastal reefs may form a bank 10-15 m. high. Sea ice in spring disappears first in the Baltic and the fast-ice edge narrows faster than it formed. The average general cycle of the ice winter is mapped. Mid-winter conditions from 1880-1948 are given in a bar graph. The length of the ice winter in weeks during medium short, long, and severe winters is mapped. The increase in the volume of ice during early winter and the decrease in late winter in different seas are plotted.

SIP U5922

Chernyshev, M.
THERMAL CALCULATION OF WATER SUPPLY LINES IN FROZEN GROUNDS. (Teplovoĭ raschet vodoprovodov v zmerzlykh gruntakh; Text in Russian). Stroitel'naîa Promyshlennost', 8, No. 2:183-184 incl. diagr. 1930.
DLC, TH4.S85, v. 8

An attempt is made to express mathematically the course of thermal processes in water pipes laid 3 m. deep in permafrost. The coefficient of heat loss is formulated as a ratio of heat discharge in cal./hr. by water pipes and the difference of the temperature of the water and the ground around the pipes. The temperature changes of water in pipes along their length in a given time is illustrated diagrammatically. Calculations of thermal regime of water supply lines are suggested.

SIP U5923

Tsytovich, N.
SELECTION OF THE FOUNDATION TYPE UNDER PERMAFROST CONDITIONS. (O vybore tipa fundamentov v usloviîakh vechnoĭ merzloty; Text in Russian). Stroitel'naîa Promyshlennost', 8, No. 6-7:519-521 incl. graph, diagrs. 1930.
DLC, TH4.S85, v. 8

Changes in soil temperature in relation to the depth of foundations is formulated mathematically. The formula takes into account the main factors influencing the temperature of ground, heat conductivity, thickness of the snow cover, and depth of the upper permafrost table. Continuous, solid foundations require the deepest and most extensive excavation which are uneconomical. Relations between average annual air temperature, snow cover thickness and average soil temperature are illustrated graphically. Studies of heaving forces require more extensive theoretical and practical elaboration.

SIP U5924

Evdokimov-Rokotovskiĭ, M.
FREEZING AS A METHOD OF LAYING FOUNDATIONS. (Vymorazhivanie kak sposob zalozheniĭa fundamentov; Text in Russian). Stroitel'naia Promyshlennost', 8, No. 10:732-735 incl. illus. graph, tables, diagr. 1930.
DLC, TH4.S85, v. 8

The freezing method was used successfully in constructing stone bridge supports in Siberia in the winter of 1929-30. Ice blocks 1.5 m. in diam. were cut out gradually and pits made below the river bottom. The wind accelerated the freezing operations. Relations between the depth of frost penetration and time of freezing are illustrated graphically for various types of ground. Coefficients of heat conductivity and heat capacity of water, ice and various types of ground are tabulated.

SIP U5925

Rikhter, G. D.
NORTHERN SECTOR OF THE EUROPEAN USSR. (Sever evropeĭskoĭ chasti SSSR; Text in Russian). Moscow, Gosizdgeoglit, 1946, 192p. incl. illus. tables, maps. [60] refs.
DLC, GB236.R5, 1946

Snow conditions, trafficability, duration of a stable snow cover, snow cover maxima, beginning and end of a stable snow cover are mapped and discussed. The ground under a heavy snow cover remains near 0°C. The permafrost appears near the surface in wind-swept and snow-denuded tundras. The seasonal characteristics, hydrological and vegetative conditions, the soils of tundra, forest tundra and forest zone are described.

SIP U5926

Narodnyĭ Komissariat Oborony SSSR
INSTRUCTION FOR MILITARY OPERATIONS DURING WINTER. (Nastavlenie dlĭa deĭstviĭ voĭsk zimoĭ; Text in Russian). Moscow, Voenizdat, 1941, 132p. incl. diagrs.
DLC, U167.5.W5R95, 1941

Winter influences on attack and defense operations are described. Special instructions are given for prevention of frost injuries, transportation over ice and snow, construction of field stations and use of munitions and instruments under winter conditions. Low temperatures, snowstorms and snow cover are considered important factors. Snow cover improves the visibility conditions. Snow depths over 30 cm. deep stops the transportation of cavalry and infantry, and at a depth of 50 cm. tanks are immobilized. Snow cover increases the effective range of poison gas released above the surface by smoothing the relief; the effectiveness of gas released by artillery shells bursting in the snow is reduced by strong snow absorption.

SIP U5927

Fil'bert, P. A.
SNOW PROTECTIVE PLANTINGS OF THE STALINGRAD RAILROAD. (Snegozashchitnye nasazhdeniĭa Stalingradskoĭ zheleznoĭ dorogi; Text in Russian). Les i Step', 5, No. 2:88, 1953.
DLC, Slavic unclassified

Coniferous trees were planted 0.7 m. apart in rows spaced 1.5 m. apart. In chernozem soil 24 rows were planted and a wider spacing (20-30 m.) was provided between the 15th and 16th row. A total of 21 rows were set in light soils and 27 rows in dark brown soils, each wood lot being interspersed with 2 wider spacings of 10-15 m. each.

SIP U5928

Shedd, John C.
THE EVOLUTION OF THE SNOW CRYSTAL. Monthly Weather Rev. (U. S.), 47:691-694, illus. tables, Oct. 1919.
DLC, QC983.A2, v. 47

The snow crystal solidifies from the atmospheric vapor, the molecules having a large degree of mobility. The open-structure type of crystal (fern-stellar type) occurs most frequently. These crystals are abundant in local storms, in the south segment of general storms, and with low-lying clouds. Crystals with solid centers are most frequent with high-lying clouds. The granular type occurs with high temperature in local storms. Doublets and needle-shaped crystals are infrequent. All tabular-type snow crystals originate from the open-structure crystal and develop into the solid hexagon form. There are 2 general transition processes, fast accretion in a supersaturated atmosphere and slow transformation in undersaturated regions. A classification of the tabular form of crystal in accordance with the successive stages of development is presented. The force of crystallization increases with proximity to the center of the crystal. The law of symmetry is operative in the restoration of the pattern in broken crystals.

SIP U5929

Paton, Hubert A.
HORIZONTAL AND VERTICAL CONTROL FOR ARCTIC MAPPING. Photogrammetric Eng. 19: 395-400, June 1953.
DLC, TA593.A2P5, v. 19

Methods of transportation of personnel and supplies are described. New techniques in surveying methods were developed to cope with the extreme weather conditions. A prospector's boiler is used to steam in the marks and stakes in the permafrost which extends down to 1000 ft. A station can be built and marks installed in just over an hour. Marks are made of 7-ft. long steel or bronze pipes, 2.5 in. in diam. A hole for the pipe is thawed with a steam jet in a few min. and the mark soon freezes solidly in place. Ground protected by tundra thaws to a depth of 6 in. in summer; bare sand thaws down to 3-4 ft. The summer heat is transmitted along the pipe into the frozen ground and moisture collects at the base of the pipe. This water freezes in the fall raising the pipe. A barrel of concrete used as a USGS marker was pushed up about 24 in. in 37 yr. Wind speeds of 10-15 m.p.h. lift the powdery snow 30-50 ft. in the air in March and reduce visibility. Sastrugis formed by the prevailing northeasterly wind offer the only method of orientation. The snow glazes over in April and May through alternate freezing and thawing and then blowing snow does not affect visibility until the wind speed exceeds 15 m.p.h. New types of clothing were tested and new living procedures devised.

SIP U5930

Barnes, Howard T.
COLLOIDAL FORMS OF WATER AND ICE. p.435-443 incl. illus. (In: Colloid Chemistry--Theoretical and Applied, vol. 1, ed. by Jerome Alexander. New York, Chemical Catalog Co. Inc. 1926). 7 refs.
DLC, QD549.A32, 1926

Water is a highly associated liquid,holding in solution molecular aggregates which possess the same physical characteristics as ice. The concentration of this solution increases with decreasing temperature to the f.p. where saturation causes the solid ice to precipitate. The blue color of iceberg ice is due to large group molecules. Iceberg ice is pressure ice with no crystal structure and without cleavage lines. Frazil ice is a flocculation of a colloidal solution occurring in open flowing water at the f.p. Anchor ice grows on river bottoms unprotected from excessive nocturnal radiation. The highest clouds consists of snow crystals; minute ice particles are present in the upper atmosphere. Colloidal particles of ice in the atmosphere produce halos; colloidal water particles produce white fog over the sea. Frost patterns on glass are typical cases of colloidal protective influence on crystallization. The nucleus which is active in causing the colloidal water-forms in the atmosphere is probably the generating influence of the solid snow crystal.

SIP U5931

Meyerhøffer, Alf
FINNISH AND RUSSIAN WINTER TACTICS. (Finsk och Rysk vintertaktik; Text in Swedish). Ny Militär Tid. 22:176-179, 1949.
DLC, U4.N88, v. 22

Finnish preparedness, equipment, training and tactics in winter warfare are contrasted with the lack of these accomplishments in Sweden. Forest combat and concealment with supply lines maintained by expert skiers were basic Finnish tactics. The numerical superiority of the Russians compelled warfare in open fields against modern tanks and artillery. The results of the Finno-Russian war indicate that Finnish tactics would be inadequate for Sweden in modern warfare. The conclusions are based on Col. Järvinen's (Finland) treatise on Finnish and Russian tactics in winter warfare.

SIP U5932

Wordie, J. M.
THE ROSS BARRIER AND THE SHACKLETON ICE-SHELF. p.102-106, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 20 refs.
DWB, M(06) I611g, S.Hyd. 1951, v. 1

Place-name nomenclature for the antarctic ice formations, generally known as ice-barriers and ice-shelves, is discussed. The word shelf-ice, suitable when discussing the ice itself, is unacceptable as a geographical term. The proposal to restrict the term ice-barrier, to the seaward face only is criticized. Barrier and shelf are generally interchangeable. Suggestions to use barrier for the big formations such as Ross Barrier, and shelf for smaller ones or those where length exceeds breadth are considered. It is recommended: that names used by the original discoverers be kept; that barrier be retained in its original and natural sense, and its use extended as a place-name in other suitable cases; that shelf-ice be rejected and ice-shelf be accepted for less extensive barriers; and that new terms be introduced when necessary.

SIP U5933

Field, W. O.
REPORT ON THE NORTHERN AMERICAN GLACIERS. p.120-128 incl. tables. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1)
DWB, M(06) I611g S. Hyd. 1951, v. 1

Information about the glaciers and their variations through the 1949 season is given for the American Rocky Mt., the Cascades, the Sierra Nevada, and Alaska. Recession, rate of ice flow, depth decrease, and observed water discharge are tabulated from 1948-1950 for the Coast Range, Selkirk Range and Rocky Mt. Range of Canada. At least 7 glaciers out of 64 have disappeared in Glacier National Park (Mont.) and 7 more are stagnant remnants of former active ice. The glaciers are receding more slowly than from 1930-1940 in the Wind River Range and Rocky Mt. National Park, and several glaciers show signs of enlargement. The terminus of Nisqually Glacier on Mt. Rainier recessed only 65 ft. from 1949-1950 instead of the 84-ft. average for 1940-1950, and the volume of the glacier increased between 1-2 mi. above the terminus. Most Alaskan glaciers are shrinking

but a significant number are advancing. The recession of the Canadian glaciers is generally decreasing, Illecillewaet Glacier of the Selkirk Range showed an increased recession over previous years.

SIP U5934

Wallen, C. C.
INFLUENCES AFFECTING GLACIER EXTENSION IN NORTHERN SWEDEN. p.145-153 incl. tables, graphs. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 11 refs.
DWB, M(06) I611g S. Hyd. 1951, v. 1

Results of investigations made on Kårsa Glacier (Sweden) are summarized. The importance of meteorological factors in the ablation process is discussed. The percentage importance of different factors in the ablation of snow and ice is tabulated. The importance of radiation processes in spring is 60-75% and 37% in summer, the most favorable conditions existing with a cloudless or partly cloudy sky, low wind speed and low temperature. Convection accounts for 25% in spring and 45% in summer and attains maximum values with a half-covered to overcast sky, high wind speed and high temperature. Condensation at the surface accounts for 5% in spring and 20% in midsummer. Evaporation, which is small due to the maritime climate, is at a maximum with little cloudiness, high wind speed and low temperature, when it accounts for 10% of the total ablation. An increased general circulation of the atmosphere in recent years has intensified the air exchange between the north and the south over the Atlantic European sector of the Northern Hemisphere, increasing the influence of factors contributing to ablation and causing a shrinkage of all the glaciers in the area.

SIP U5935

Hare, F. Kenneth
RECENT INVESTIGATIONS INTO THE DISTRIBUTION OF SNOW AND ICE IN EASTERN CANADA. p.167-171 incl. graphs. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 11 refs.
DWB, M(06) I611g S. Hyd. 1951, v. 1

Hudson Bay pack ice and the snowfall in Labrador-Ungava are discussed. Upper-air stations distributed around the shores of Hudson Bay permitted the study of the modifications of continental polar air masses over the Bay. The predominant air flow is across the Bay from northwest to southeast. Cold air crossing the Bay reaches Quebec with an unstable layer in the lower troposphere extending from sea level to 7000-10,000 ft. in the autumn, its depth and degree of instability diminish in Dec. and no essential change in structure while crossing the Bay occurs from mid-Jan. to June. The unstable layer in autumn is produced by heating from below over the unfrozen waters of the Bay and the stability during winter and spring is attributed to the formation of ice over Hudson Bay. Four winters of photographic aerial reconnaissance have confirmed the existence of Hudson Bay pack-ice sheet, with the area south and west of the Belcher Islands being the last to freeze. Heavy snow along the east coast of Hudson Bay in Nov. and its disappearance in Jan. substantiate the theory of a frozen bay after Jan.

SIP U5936

Fristrup, B.
CLIMATE AND GLACIOLOGY OF PEARY LAND, NORTH GREENLAND. p.185-193 incl. illus. table, graphs, map. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 5 refs.
DWB, M(06)I611g.S.Hyd. 1951, v. 1

Peary Land is snow-free in summer. During winter the snow is compressed by the wind, the snow surface is very hard, and sastrugi are a characteristic feature. Accumulation and ablation measurements along a north-south line across the highest point of Chr. Erichsen Glacier are tabulated. Ablation, due partly to snow melt but largely to evaporation, exceeds accumulation. Evaporation starts in May before the air temperature reaches 0°C. Ice melting does not occur before the end of July and is frequently interrupted by frost and snowstorms. The whole glacier is an immobile mass of dead ice diminishing each year.

SIP U5937

Goloskokov, V. P.
PERMAFROST IN HIGH-MOUNTAIN SWAMPS OF THE NORTHERN TIEN SHAN. (Vechnaîa merzlota v vysokogornykh bolotakh severnogo Tîan'-Shanîa; Text in Russian). Trudy Sessiĭ Akademii Nauk Kazakhskoĭ SSR, Alma-Ata, No. 3:310-318 incl. diagrs. 1949.
DLC, AS262.A59, No. 3

Permafrost formations were found in many points of the northern Tien Shan starting at depths of 50-60 cm. in peat covered mounds of swamps. Permafrost was usually absent in mounds with a destroyed peat cover. Investigations showed ground displacement in permafrost zones. The permafrost zones are probably the relic fragments of a glaciation period now disappearing under influences of climatic warming and a decrease in soil moisture.

SIP U5938

Schaefer, V. J., G. J. Klein and M. R. de Quervain
OUTLINE OF AN INTERNATIONAL SNOW CLASSIFICATION. (Entwurf einer internationalen Schneeklassifikation ausgearbeitet durch das Komitee fur Schneeklassifikation; Text in German). p.129-141 incl. illus. tables, diagrs. [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1)
DWB, M(06) I611g S.Hyd. 1951, v. 1

The scheme is based on the definition of solid preci-

pitation and deposited snow according to qualities directly measurable and observable. Genetic qualities are considered in classifying the snow surfaces. Observations are recorded by means of numbers, code symbols, concepts and graphs. Existing international meteorological symbols have been adopted whenever suitable. A sample classification of a snow surface, a glossary of snow terms and a list of code symbols are included. (See also SIP U3482)

SIP U5939

Obenland, E.
ON THE PROPORTION OF SNOW IN PRECIPITATION. (Über den Schneeanteil am Niederschlag; Text in German). Ber. deut. Wetterdienstes U. S. Zone, 6, No. 38:167-171 incl. tables, 1952. 5 refs.
DLC, QC852.D452, v. 6, No. 38

A new method of determining the proportion of precipitation which falls as snow is described. The proportion consisting of pure snowfalls is obtained directly from the corresponding precipitation quantities; the snow content of mixed precipitation is calculated from the new snow depths on the basis of mean water content measurements of the snow. The method is applied to observations made at Oberstdorf from 1936-1951, and the results are compared with the methods of Steinhäusser and Conrad.

SIP U5940

Brose, K.
ON SNOW CONDITIONS OF THE LAST 50-60 YEARS IN CENTRAL AND SOUTHERN WEST GERMANY. (Über Schneeverhältnisse der letzten 50 bis 60 Jahre im mittleren und südlichen Westdeutschland; Text in German). Ber. deut. Wetterdienstes U. S. Zone, 6; No. 38:171-177 incl. tables, graphs, map, 1952. 8 refs.
DLC, QC852.D452, v. 6, No. 38

The number of days with snow cover and greatest snow depths are tabulated and plotted for 21 stations ranging in elevation from 189-920 m., covering the period from 1901-1950. It is shown on the basis of decade values that the values decrease up to 1920 or 1930 and increase thereafter. Maximum snow depths were recorded in 1940-41 and 1941-42. The winters with maximum number of days with snow cover do not coincide with winters of maximum snow depths.

SIP U5941

Kölzer, J.
SNOW CONDITIONS IN THE ALPINE FORELAND IN WINTER 1951/52. (Die Schneeverhältnisse in den Voralpen im Winter 1951/52; Text in German). Ber. deut. Wetterdienstes U. S. Zone, 6, No. 38: 178-181 incl. tables, 1952. 5 refs.
DLC, QC852.D452, v. 6, No. 38

Minimum and afternoon air temperature values, precipitation and snow depths are tabulated for various stations and compared for each of 2 stations of approximately the same elevation but with orographic contrasts, for the winter of 1951-52. Results indicate the considerable influence of temperature differences on the snow cover.

SIP U5942

aufm Kampe, H. J.
HUMIDITY CONDITIONS IN CIRRUS CLOUDS AND THE RESULTING FORMS OF ICE CRYSTALS. (Feuchtigkeitsverhältnisse in Cirruswolken und die daraus resultierenden Formen der Eiskristalle; Text in German). Ber. deut. Wetterdienstes U. S. Zone, 6, No. 38:298-302 incl. illus. table, graph, 1952. 10 refs.
DLC, QC852.D452, v. 6, No. 38

The growth of ice crystals and the resulting decrease of relative humidity in cirrostratus clouds are calculated by assuming various plausible particle concentrations. Results indicate that with increasing crystal size the relative humidity first decreases slowly, then rapidly, and that the ice crystals have a length of about 56, 120, and 260 μ and a width of 14, 30, and 66 μ. It is concluded that while cirrostratus is mostly formed in air slightly under-saturated with respect to water, the clustered crystals of cirrocumulus form in supersaturated air. A humidity of about 110% with respect to ice appears necessary for regular prisms.

SIP U5943

Weickmann, H.
THE PROBLEM OF ARTIFICIALLY INCREASING UPSLOPE PRECIPITATION. (Das Problem der künstlichen Vermehrung von Aufgleitniederschlägen; Text in German). Ber. deut. Wetterdienstes U. S. Zone, 6, No. 38: 401-407 incl. tables, graphs, 1952. 21 refs.
DLC, QC852.D452, v. 6, No. 38

The amount of precipitation created by a simplified but typical warmfront-upslope mechanism is quantitatively analyzed. The calculations are based on snow and ice crystal measurements obtained over a period of 3 winters at the Hohenpeissenberg Station. The conditions existing in a release cloud are studied on the basis of tables indicating the growth of precipitation elements of various concentrations in altostratus and nimbostratus clouds, and the growth of ice crystals by sublimation in the release cloud. Results indicate that the intensity of warmfront-precipitation depends mainly on the intensity of the convergence process, and not on the number of precipitation elements.

SIP U5944

Weickmann, Helmut
THE ICE PHASE IN THE ATMOSPHERE. (Die Eisphase in der Atmosphäre; Text in German). Ber. deut. Wetterdienstes U. S. Zone, 1, No. 6, 54p. incl. illus. tables, graphs, diagrs. 1949. 73 refs.
DLC, QC852.D452, v. 1, No. 6

Results of 6 yr. research on formation, appearance, occurrence, and growth of the ice phase in the laboratory, on the ground, and in the atmosphere up to altitudes of 10 km. are given. The most important result is the theoretical and experimental proof that no sublimation nuclei exist and that down to cirrus temperatures crystals form on freezing nuclei via the state of water saturation, or at least at ice supersaturation humidities. The key to the explanation of the shape and growth of the principal types of atmospheric ice crystals is thus found. (Author's summary)

SIP U5945

Péguy, Charles-Pierre
SNOW (La neige; Text in French). Paris, Presses Universitaires de France, 1952. 120p. incl. graphs, maps, diagrs.
DLC, QC929.S7P42

The meteorological conditions favoring the occurrence of snow are discussed, and snow measurements are defined. A map of snowfall for the northern hemisphere shows the large amount of snow falling in N. Am. compared to that in Siberia. Crystallography and stratigraphy of fallen snow as a basis for avalanche study is presented. The extent and duration of the Alpine and Siberian (arctic) snow cover are compared. The Alpine cover, a result of 5 m. or more of snowfall occurring mainly at the beginning and end of the cold season, is susceptible to avalanche formation. The Siberian (arctic) cover is a result of spasmodic snowfalls totalling no more than 1 m., and occurring mainly at the beginning of the cold season. This cover is seldom more than 30 cm. thick, persists from 6-8 months, is not stratified, and provides an excellent surface for foot and sled travel. Perpetual snow, its contribution to existing glaciers, the perpetual snow line as an index to climatic change, and the influence of snow on man are discussed.

SIP U5946

Hynes, Lee P.
ELECTRICAL POWER INDUSTRY HAS MANY HEATING AND AIR CONDITIONING PROBLEMS. Heating, Piping, and Air Conditioning, 6:382-386 incl. illus. table, Sept. 1934.
DLC, TH7201.H45, v. 6

Heat, humidity and ice cause problems in various stages of the power industry. Methods used in their solution are presented. Ice is a menace when it collects above dams, freezes the gates or blocks the intake racks, and when sleet overloads transmission lines. A heating system conducting heat to all the movable parts of the gates in a dam is described. Waterproof heaters are attached to the interior surfaces of a gate at points needing special protection. A portable 1500-gal. insulated hot water storage boiler is used at Conowingo Dam to cut ice formations loose from their attachments. A low voltage current passed through the bars of steel racks warms them sufficiently to loosen the ice. A low voltage, high amperage current sent through transmission lines overloaded with sleet will loosen the sleet and prevent ice loads from breaking the lines.

SIP U5947

Still, E. W.
TEMPERATURE CONTROL OF JET-ENGINED AIRCRAFT. J. Roy. Aeronautical Soc. 57:89-102 incl. illus. tables, graphs, diagrs. Feb. 1953.
DLC, TL501.R7, v. 57

The control of the compressed air available for the operation of many aircraft services was studied. Temperature control of pressure cabins, de-icing of engine intakes and wing surfaces are discussed. Wind screen heating and de-icing will prevent large scale deposits of frost on an externally cold aircraft passing through high humidity conditions. A hot air sandwich with a very thin external screen transfers heat from the heated inner skin to the cold external surface, the air temperature being controlled by a mixing valve. The compressor air temperature of 350°C or more is diluted to 180°C by an air injector for wing anti-icing protection. The quantity of air used is controlled by a sensing element in the wing leading edge to prevent bad effects from excessive flow on the engine thrust. Electrical methods of de-icing are discussed. Icing indicators operating in series with the air thermometer are used to start the anti-icing equipment. The relative value of icing indicators and icing anticipators is considered.

SIP U5948

Jensen, Ralph C.
HOW WELLS ARE DRILLED IN PERMAFROST. World Oil, 135:152-158 incl. illus. map, Dec. 1952. 2 refs.
DLC, TN860.05, v. 135

Naval Petroleum Reserve No. 4 is in the belt of continuous permafrost. The active layer is generally less than 2 ft. deep. The thickness of the permafrost layer varies from 600 ft. on the northern shore of Alaska to 1100 ft., 200 mi. southward in the foothills of Brooks Range. Constant temperatures of the permafrost range from 32°F at the lower depth to 14°F at about 100 ft. from the surface. The temperature varies seasonally above 100 ft. The thermal gradient is similar to that in temperate zone wells but from 50°-60°F lower. Piling is set into any competent formation found above a depth of 50 ft. A mat of timbers with refrigerating coils attached to the underside is placed on top of the ground under the structure to be supported when frozen muck extends to 50 or more ft. below the surface. The cementing operations were done according to a method perfected by F. L. White. The conductor pipe is set 30 ft. into the first competent bed encountered. The top 60 ft. are jacketed with a larger pipe to provide a 2-3 in. dead air space. A few cases of constricting formations of ice, when drilling at shallow depth, were noted. The relation of such formations to casing collapse is discussed. Drill-

ing throughout the year is secured by enclosing the drilling rig with a double layer of canvas and heating the enclosure with steam provided by a small boiler. (See also SIP U4286)

SIP U5949

NACA LEARNING HOW TO BREAK THE ICE. Aviation Week, 58, No. 2:20-2. incl. illus. diagrs. Jan. 12, 1953.
DLC, TL501.A8, v. 58

Ice can be removed from airplanes mechanically or by the continuous or cyclic application of heat. Heat requirements are often prohibitive and a performance penalty is apparent for highspeed, high-altitude transports when heat is applied continuously. Intense heat is used for short periods in cyclic removal of ice. Design studies demonstrate the advantages of hot gas over electricity. Tests were made in the Lewis Lab icing research tunnel on a low-drag airfoil with an 8-ft. chord at airspeeds of 180-280 m.p.h., an angle of attack of 2-8°, air temperatures of -11° to 20°F and a gas inlet temperature of 200°-510°F. Best de-icing results with minimum runback of melted ice, efficient ice removal, and minimum total heat input, were obtained with a heat-on period of 15 sec. and a heat-off period of 260 sec.

SIP U5950

Lovell, Charles W., Jr. and Moreland Herrin
REVIEW OF CERTAIN PROPERTIES AND PROBLEMS OF FROZEN GROUND, INCLUDING PERMAFROST. SIPRE Rept. 9, 124p. incl. illus. tables, graphs, diagrs. March, 1953. [250] refs.
SIPRE files

The intrinsic factors and a limited coverage of the environmental factors influencing freezing and thawing actions are presented. The topics reviewed include: the theory of frost action in saturated and non-saturated soils and the disturbances produced by the freezing and thawing cycle; the effects of frost action as manifested by frost heave on freezing in seasonally and perenially frozen ground; reduction in load-carrying capacity on thawing, and soil movements along slopes. Material on ground properties and conditions affecting or affected by frost action include reports on the composition and thermal properties of soils, structure of unfrozen and frozen ground, density and degree of compaction, degree of saturation and the theory of f.p. depression. Surface icing and its control conclude the review. A summary of research recommendations is included.

SIP U5951

Blanks, R. F.
TEN-YEAR REPORT ON THE LONG-TIME STUDY OF CEMENT PERFORMANCE IN CONCRETE. J. Am. Concrete Inst. 24:601-614 incl. illus. table, March 1953. 8 refs.
DLC, TA681.A58, v. 24

The study was conducted to determine relationships between composition, fineness and manufacturing conditions of test cements, and resistance of the corresponding concretes to influence of water, chemicals, temperature changes and highway traffic with or without applications of salts for ice removal. The 3 test roads represented severe, moderate, and mild exposures in N. Y., Mo., and S. C. A comparison of 24 test cements used in N. Y. indicates that defects due to cement performance occurred in the non-air entraining cements without relation to the cement types. None of the air-entraining cements showed defects. The performance of 6 cements in concrete of 5-in. slump was similar to that of concrete of 3 in. slump. A comparison between 6 air- entraining and 6 non-air-entraining cements on the section where $CaCl_2$ was used for ice control showed heavy scaling in the non-air-entraining and no scaling in the air-entraining cements. It is concluded that air entrainment greatly increases the resistance of concrete to freezing and thawing without deterioration and prevents scaling when chlorides are used for ice control.

SIP U5952

Slobodchikov, D. D.
RETENTION OF MELTWATER AS AN IMPORTANT MEASURE FOR INCREASING SOIL MOISTURE AND YIELDING CAPACITY. (Zaderzhanie talykh vod-vazhnoe sredstvo bor'by za vlagu i povyshenie urozhaĭnosti; Text in Russian). Sovetskaîa Agronomiîa, 9, No. 3:84-87, 1951.
DLC, S13.S88, v. 9

Spring precipitation in southeast European USSR provides only 50-60% of the moisture required for normal crop growth. The remainder is obtained from moisture accumulated by the soil during the autumn-winter period. Investigations in the Transvolga region showed that the losses from meltwater run-off are equivalent to 35 mm. of water or about 50% of winter precipitation. Soil with a higher percentage of moisture in autumn freezes deeper, increasing meltwater run-off. A deep snow cover decreases the depth of soil freezing and run-off. Experiments indicated the importance of snow retention for meltwater storage. Snow banks made by snowplows spaced 15-30 m. apart, and compacted by hand accumulated up to 85% of the meltwater and prolonged the period of snowmelting for 7 days. One-m. wide strips of dark material (ashes, soil, peat) spread over the snow cover at intervals of 7-10 m. effected earlier, and more intensive snowmelting and rapid soil thawing, which produced good water penetration into the soil.

SIP U5953

Gonchukov, V. I., E. N. Petrinskiĭ and L. F. Pustovoĭtov
NOTES ON GLAZE DAMAGE PREVENTION ON COMMUNICATION LINES. (Pamîatka po bor'be s gololedom na provodakh svîazi; Text in Russian). Moscow, Transzheldorizdat, 1943. 20p. incl. tables.
DLC, TK5401.P3, 1943

Ice formations on communication lines consist of glaze, rime, a mixture of glaze and rime, and frozen wet snow. The most dangerous is glaze from supercooled rain, falling at temperatures from -3° to 0°C, and forming an ice crust of 50 mm. and more. Glaze usually forms during Nov., Dec. and March in unstable weather. Rime is a deposit of a crystalline structure also observed during winter. The thickness of rime does not usually exceed 25 mm. The USSR is divided into 4 regions of glaze susceptibility for communication lines. A description of the line system, diam. of communication wires, and pole intervals for each region is presented. Quick removal of ice deposits from wires by striking them with bamboo posts is recommended.

SIP U5954

Calloway, E. B. and H. S. Kaminski
ICE THICKNESS FORECASTING AS APPLIED TO BAFFIN BAY - DAVIS STRAIT AREA. Dept. of the Navy. Hydrographic Office, 11p. incl. tables, 1953. (typed ms.)
DN-HO, Case 15, Drawer 1

Methods to determine the time required for the water surface to freeze and to compute the thickness of the ice accretion from predicted weather conditions are discussed. The date of the first freeze is determined from the time required by the water mass to reduce its temperature to the f.p. by convection. No freezing occurs if the freezing season is over before the surface temperature is reduced to the f.p. Vertical mixing reaching deeper and deeper produces a homogeneous water column down to the depth where convection ceases. The length of time needed to bring the surface layer to the f.p. depends on the vertical density distribution. The date of the first freeze at a given location in the Davis Strait from an oceanographic sounding taken on Aug. 11 is computed. The methods used by A. G. Kolesnikov and Olaf Devik to determine ice thickness are reviewed. The thickness may be computed from a formula based on Fourier's heat conduction equation, or from graphs consisting of parametric curves of ice thickness when no snow cover is present and the original ice thickness is neglected. The rate of ice growth diminishes as the ice thickens up to 50 cm. when no snow is present, then the thickness increase becomes a linear function of time. The first 50 cm. develop in about 18 days with an average temperature of -20°C. The ice growth becomes a linear function of time sooner if a snow layer is present. A 10-cm. increase of ice thickness occurs in 8 days when no snow is present, in 14 days with a 20-cm. snow layer, in 20 days with a 40-cm. snow layer, and in 32 days with a 50-cm. snow layer.

SIP U5955

Bracht, Johannes
ON THE THERMAL CONDUCTIVITY OF SOIL AND SNOW, AND THE HEAT UTILIZATION IN SOIL. (Über die Wärmeleitfähigkeit des Erdbodens und des Schnees und den Wärmeumsatz im Erdboden; Text in German). Veröffentl. Geophysikalischen Inst. Univ. Leipzig, Ser. 2, 14, No. 3:147-225 incl. illus. tables, graphs, diagrs. 1949. 36 refs.
DA, 334B722

The thermal conductivity of soil and snow was measured by specially constructed heat conductivity meters based on the Albrecht principle; specially constructed resistance thermometers were used to measure the soil and snow temperatures. The investigations were made in different soils and with 2 separate measuring methods. The layers of the 35-cm. snow profile were individually examined, and indicate an increase in density with depth, except for raincrusts which posssess higher densities. Measured thermal conductivity values of the snow ranged from 0.00022 gm. cal./cm. sec. degree for a density of 0.191 gm./cu. cm. to 0.00067 gm. cal./cm. sec. degree for a density of 0.35 gm./cu. cm. A plot of the thermal conductivity values as a function of snow density yields a quadratic parabola of the form 0.0049 times the square of the density. An error of ± 10% is obtained for thermal conductivity values calculated by the empirical formula. A 24-hr. snow temperature series was analyzed harmonically, and the thermal conductivity calculated from the calculated logarithmic decrements of amplitudes and the phase displacements of the individual partial waves. Only satisfactory values are obtained from the first wave; the thermal conductivity calculated by the formula agrees with that calculated from the amplitude, but is half as large as that calculated from the phase period.

SIP U5956

Renaud, André
NEW CONTRIBUTION TO THE STUDY OF THE GLACIER GRAIN. (Nouvelle contribution à l'etude du grain de glacier; Text in French). p.206-211 incl. tables [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 12 refs.
DWB, M(06) I611g S.Hyd. 1951, v. 1

Glacier ice is a polycrystalline aggregate in which the pure ice crystals are separated from each other by a weak saline film. Glacier studies were conducted in 1949 in the ice laboratory located inside the Z'Mutt Glacier (Switzerland) on pure glacier ice, free of atmospheric influences and surface water infiltration. The polarographic analysis of the substances dissolved in the film ascertained the presence of Cl^-, NH_4^+, Na^+, NO_3^- and SO_4^- ions which exist in snow and which concentrate in the course of metamorphism on the periphery of the grains. It is believed that these impurities contribute to increase the proportion of the liquid phase of the ice of temperate glaciers which has been formerly attributed exclusively to pressure action. It is believed that

the importance of the liquid phase may influence the mesoplasticity of the ice. (Author's abstract) (See also SIP U1253)

SIP U5957

Dobrowolski, A. B.
ON A PROBLEM RELATED TO GLACIER PETROGRAPHY (1): GLACIER SECTIONS SHOW A PARALLELISM OF THE OPTICAL AXES OF THE GRAINS, ARE THEY MONOCRYSTALLINE? (Sur un probleme relatif a la petrographie des glaciers (1): Les portions des glaciers montrant un parallelisme des axes optiques des grains, sont-elles des monocristaux?; Text in French). p.212-213, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 11 refs.
DWB, M(06) I611g S.Hyd. 1951, v. 1

The mechanics of the mutual orientative influence of 2 minerals of different crystal structures in molecular contact with each other are discussed. Regular fusion of different crystals has been observed in nature and has been artificially produced. It was found that the directions of hoar frost crystals forming on mica are defined by the axes of the base crystal. A composite ice cover consists of ice crystal aggregates of parallel principal and non-parallel secondary (optical) axes. The supposedly non-parallel secondary axes are more nearly parallel in this case, the difference in direction unable to exceed 30°. It is concluded that even a large-size ice cover forms one single crystal, in spite of the initial lack of parallel secondary axes. A parallelism of optical axes is observed in the crystals of glacier ice, at least in the ablation areas, and it is believed that also the secondary axes are parallel. A verification of these conclusions by the Tyndall method is recommended.

SIP U5958

Haefeli, R. and P. Kasser
VELOCITY CONDITIONS AND DEFORMATIONS IN AN ICE ADIT OF THE Z'MUTT GLACIER. (Geschwindigkeitsverhaeltnisse und Verformungen in einem Eisstollen des Z'Muttgletschers; Text in German). p.222-236 incl. illus. tables, diagrs. [1951]. (In: Union géodésique géophys, intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 13 refs.
DWB, M(06) I611g S. Hyd. 1951, v. 1

Glacier velocities were measured in the vertical profile through the tunnel on the glacier surface and in the 1-km. tunnel, driven to 90 m. below the glacier surface. Results indicate that the plastic deformation depends upon the thickness of the overlying ice masses. Width decreases faster than height in a rectangular tunnel. The shape of a circular tunnel is largely maintained during deformation. Water pressed out of the crystal boundaries and refreezing on the tunnel walls contributes to the closing of a tunnel due to plastic deformation. The formation of a blue band in an artificial crevice was observed during the regelation process. Ice viscosity was measured by means of Somigliana's method and the procedure was based upon measuring of the contraction speed of circular adits. Results indicate a reduction in ice viscosity with increasing hydrostatic pressure. Mechanical and thermodynamic processes must be considered in evaluating glacier movement and glacier-ice viscosity. (Authors' abstract)

SIP U5959

Remenieras, M. G. and M. M. Terrier
THE ELECTROTHERMIC E.D.F. DRILL FOR GLACIER BORING. (La sonde electrothermique E.D.F. pour le forage des glaciers; Text in French). p.254-260 incl. illus. diagrs. [1951]. (In: Union géodésique geophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 4 refs.
DWB, M(06) I611g S. Hyd. 1951, v. 1

The theoretical penetration speed of a thermal drill and the optimum electric resistance for heating the device are derived. The construction of the rig is described. Borings totalling 2 km. were made on the Mer de Glace Glacier near Chamonix in 1948-1950 to determine the depth of the bedrock. The mean penetration speed was 20-25 m./hr. and the mean boring diam. 60-80 mm. The bore hole remains filled with water which flows out when bedrock is reached. Possible refreezing of the water in the hole during boring may be eliminated by applying additional heat or by scraping the hole with the tool. (See also SIP U857)

SIP U5960

Zingg, Th.
RELATIONSHIP BETWEEN TEMPERATURE AND MELTWATER AND ITS IMPORTANCE FOR PRECIPITATION AND RUN-OFF. (Beziehung zwischen Temperatur und Schmelzwasser and ihre Bedeutung für Niederschlags und Abflussfragen; Text in German with French summary). p.266-269 incl. graphs, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1)
DWB, M(06) I611g S. Hyd. 1951, v. 1

The sums of the daily mean positive temperatures prevailing from Jan. 1-Sept. 30 in various alpine regions were calculated from 1864 and compared with glacier variations. The glacier tongues were primarily affected; the effect on glaciers was retarded from 1-13 yr. The relationship between run-off and temperature is demonstrated for 3 locations. Long-period temperature sums indicate the magnitude of minimum possible ablation. (See also SIP U4167)

SIP U5961

Jakhelln, Anton
MAPS OF SNOW ACCUMULATION-A METEOROLOGICAL AID TO HYDROLOGY. p.270-276 incl. table, graph, maps, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1)
DWB, M(06)I611g S. Hyd. 1951, v. 1

Snow drifting in treeless, mountainous areas of Norway makes the direct measurement of the amount of accumulated snow difficult. An indirect method to determine the amount of snow by means of meteorological observations is presented. It is based on the date of the beginning of snow accumulation, the amount of subsequent precipitation, and the relationship between the normal temperature conditions and the beginning of the snow accumulation. An isochronic map showing the dates when the normal temperature falls below 0°C at the 400 m. level and a map showing the percentage of accumulated snow on March 31, 1951 in relation to the normal at the 400 m. level are presented. No allowance is made for solar radiation, evaporation, condensation of air moisture, rain, and possible melting and run-off during the accumulation period. The maps give a general picture of snow conditions but should be interpreted with discretion.

SIP U5962

Dhir, R. D.
THE FEASIBILITY OF SNOW SURVEY IN THE HIMALAYAS. p.305-314 incl. tables, map, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1)
DWB, M(06)I611g S. Hyd. 1951, v. 1

The elevation, extent of areas under snow, and depth of the snow cover were analyzed in 9 catchments to determine the feasibility of snow surveying in different regions of the Himalayas. Snow accumulation and snow melt computed for the various altitudinal zones of the mountain areas of these catchments are tabulated. The snow contribution to river run-off from March-May was calculated. It is negligible for 2 catchments and varies from 9-26% of the total run-off in the other 7. The forecasting of the river run-off during the snow-melt season by snow survey in the Himalayas is not considered feasible; the contribution is too limited and the cost of the survey too high.

SIP U5963

Klaeboe, H.
SNOW INVESTIGATIONS IN NORWAY. p.315-318 incl. table, graph, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1)
DWB, M(06)I611g S. Hyd. 1951, v. 1

The use of snow surveys for estimating spring run-off is discussed. Variable precipitation during the snow-melting period makes it difficult to obtain good agreement between the amount of snow and the subsequent run-off. An empirical formula expressing a linear relationship between water content and run-off is given for the Aursund district and a comparison between the actual and computed run-offs is charted. The error was less than 20% for 82% of the time. Refinements are discussed for the Aursund and Tysso districts by considering the rainfall occurring at the basin outlet during the melting period. The run-off formula can be improved further by assuming that the amount of rainfall over the entire basin bears the same relationship to that measured at the basin outlet, as the water content of the snow at the outlet and the average for the basin.

SIP U5964

Tonini, Dino
ON THE CORRELATIONS BETWEEN SNOW PRECIPITATION AND FLOW OF A TYPICAL WATER COURSE. (Sur les correlations entre precipitations neigeuses et debits d'un cours d'eau typique; Text in French). p.322-329 incl. table, graphs, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1). 9 refs.
DWB, M(06)I611g S. Hyd. 1951, v. 1

The streamflow forecasting method described is based upon the knowledge of the water quantity accumulated in the snow cover of a basin during a certain period. The procedure applied for determining the meltwater run-off relates the run-off to the mean daily temperatures during the melting period in the highest parts of the basin and the mean daily run-off expressed in mm./degree. This value is used for determining the meltwater quantity in the different parts of the basin, in accordance with the mean daily temperatures prevailing during the respective melting periods. The hypsometric, dry-out and run-off curves and the thermal gradients are presented. The values related to the snow cover and melting periods are tabulated and discussed. The mean annual precipitation of the Ansiei Basin (Italy) is 1214 mm., the mean temperature is 5.1°C and the snow cover depth is 259 cm. The melting coefficient is 2.2 mm./°C, the mean run-off 72.8 mm. and the mean run-off coefficient in proportion to the snowfall, 0.47.

SIP U5965

Sulzlee, C.
STUDY OF SNOW AND AVALANCHES. (Etude de la neige et des avalanches; Text in French). p.330-331, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1)
DWB, M(06)I611g S. Hyd. 1951, v. 1

An example of the methods used by the Avalanche Forecasting Service in the Pyrenees to study the degree of danger of an avalanche is presented. The avalanche-release zone surveyed extends from 2100-2300 m. elevation. The degree of avalanche

danger from a roof sloping towards the valley side, on which large snow masses accumulate was determined by measuring the snow cohesion, snow grain size and form throughout the snow profile and temperature distribution inside the snow cover. Snow melting and decrease in cohesion were observed as soon as the temperatures increased in spring. The melting process was faster than the decrease in snow cohesion and no avalanche occurred in spite of the unfavorable roof position..

SIP U5966

de Quervain, M. and others
THE AVALANCHE CATASTROPHES IN THE SWISS ALPS, JANUARY AND FEBRUARY 1951. (Ueber die Lawinenkatastrophen in den Schweizeralpen Januar und Februar 1951; Text in German). p.332-346 incl. illus. tables, graphs, maps, [1951]. (In: Union géodésique géophys. intern. assoc. hydrologie sci. Assemblée générale de Bruxelles, 1951, v. 1)
DWB, M(06)I611g S. Hyd. 1951, v. 1

The avalanche releases are attributed to excessive snow precipitation (up to 400% of the average snow precipitation recorded over long periods of time) and metamorphosis of the snow cover due to large temperature differences between the warm soil and the cold new snow. The specific shear and tensile strength of the snow at higher elevations increases faster than the settling of the snow under the growing weight of snow accumulation, causing the release of snow slabs which turn to dust or ground avalanches at lower elevations. The snow cover profiles at Büschalp (1960 m. elevation) and Weissfluhjoch (2540 m. elevation) indicate that the metamorphism affected the whole snow profile at the higher elevations, and a layer of 50-70 cm. at the lower level. Ram resistances up to 254 kg. and specific weights as high as 1620 kg./cu.m. were measured. The regional snowfall distribution from Jan. 16-22, 1951, the snow cover development from Jan. 4-Feb. 12 in 3 Swiss regions, and the variation of the Jan. precipitation of Davos since 1887 are graphically presented. The individual avalanche catastrophes are described and locations mapped. Avalanche defense constructions for different sections of the avalanche course and artificial release of avalanches are discussed.

SIP U5967

Canada. Dept. of Mines and Technical Surveys
CANADIAN ICE DISTRIBUTION SURVEY PROJECT PRESENTATION. Geographical Branch, Programme of Research on Canadian Geography, File No. C-2-2-9, 15p. incl. appendices I-III, 1951. (typed ms.)
DN-HO, GB2410 Canada 1951

Ice surveys made prior to 1947, including the British Admiralty Monthly Ice Charts of the Arctic Seas and the Ice Atlas of the Northern Hemisphere, are reviewed. A glossary of ice terminology compiled by the Geographic Branch in 1947 and approved by the Canadian Navy is appended. The formation, object, scope, and program of the Canadian Panel on Ice Distribution is presented. Its general purpose is to extend the knowledge of the formation, extent, and movement of the different types of floating ice and the accompanying navigational difficulties. A file of information on ice conditions, mainly on floating ice, will be established and the information mapped. Stress will be laid on ice distribution and not on the physics, chemistry, or mechanics of ice formation and will not include any restricted information. A method of gathering information and contributing it to the file is outlined.

SIP U5968

Linell, Kenneth A.
USE OF ICE AS A LOAD-SUPPORTING SURFACE. 7p. illus. tables, graphs, diagrs. [1951]. (typed ms.)
DN-HO, GB2407 Linell

Ice is a highly viscous material, has the characteristics of a solid, and is extremely variable in its failure strength. Ice strength varies with temperature, rate of loading, presence of incipient fractures, size of specimen, temperature of ice formation, impurities, salinity, crystal size and orientation. Ice is generally in a complex, varying state of internal stress and its characteristics in vertical and horizontal dimensions may vary markedly. The deformation of a floating ice sheet loaded to failure under a concentrated load was studied. Curves showing the thickness requirements according to elastic theory analyses with safety factors of 1.0 and 2.0 are computed. The estimated ultimate or breakthrough condition is indicated. Russian experience with ice crossings over the Gulf of Finland is related. Vehicles moving at speeds of 15-25 m.p.h. may create sufficiently intense resonant waves in the ice sheet to cause it to break. An ice mechanics test kit used to check ice heaving capacity is described.

SIP U5969

Dubois, B.
PRECIPITATION MEASUREMENTS ON MONT-VENTOUX FROM 1934-1937. (Mesures des précipitations effectuées au Mont-Ventoux de 1934 à 1937; Text in French). Météorologie, [16]:157-161 incl. illus. table, diagr. July-Dec. 1940.
DWB, M(05)S678MM, 1940

The observatory, situated at 1912 m. elevation and exposed to violent NW and SE winds up to 120 km./hr. is in the fog most of the winter and subjected to heavy icing. Ice grows windward and obstructs the snow gages especially when the wind shifts and blows in a direction opposite to the rime already deposited. The influence of topography on snow measurements is discussed. Measurements obtained with an Association rain gage and a Mougin snow gage from Dec. 11, 1934-Oct. 9, 1937 are compared. The Mougin gage measurements exceed the Association gage measurements by 19% instead of the 6-10% excess noted in plains.

SIP U5970

Brun, E.
AIRPLANE ICING. (Le givrage des avions; Text in French). Météorologie, [24]: 78-81 incl. tables, Jan.-March 1948.
DWB, M(05) S678MM, 1948

The rime formed on airplanes contains large amounts of air and looks opaque and milky when the droplets are small and the temperature is low. The ice is transparent when the drops are large and the temperature is near 0°C. The latter formation develops quickly and is the most dangerous. The amount of kinetic heat developed by a moving object is discussed. A plane will not ice when traveling at speeds over 100 m./sec. in a cloud at -3°C or at speeds over 200 m./sec. in clouds at -12°C. The coefficient of catch is discussed, and a general method of calculating the capacity of an anti-icer is suggested.

SIP U5971

Dubois de Prisque, B.
AVALANCHES AND METEOROLOGY. (Avalanches et météorologie; Text in French). Météorologie, [20]: 168-184 incl. tables, graphs, Jan.-June, 1944.
DWB, M(05) S678MM, 1944

The French and Swiss classifications of avalanches are presented and correlated. The 3 French types are the ground avalanche, consisting of heavy wet snow sliding over the ground, the dust avalanche, when light, dry snow descends, and the surface avalanche, when a superficial layer of fresh snow slides on an older snow layer. Conditions favorable to avalanche release are discussed. Results of a study of avalanches in the Savoie and Haute Savoie Departments with prevailing meteorological factors are tabulated for the period 1920-1942 (1939-40 lacking). Avalanches vary in number from year to year, the largest number of ground and surface avalanches occurring when snowfall is heavy, while dust avalanches seem to occur at low temperatures. Ground and surface avalanches are prevalant in March, dust avalanches in Jan. Ground avalanches are the most frequent, dust the least, though the number of dust avalanches is relatively higher during periods of high avalanche frequency. Minimum elevations of avalanche release are highest for dust and lowest for ground avalanches. A temperature rise is generally noted before avalanche occurrence; 86.3% of the avalanches occurred during snow or rain, 8.5% with a clear sky, 5.2% with south to southwesterly winds without the occurrence of snow or rain.

SIP U5972

Baldit, A.
COLORED SNOWFALL OBSERVED AT CHASSERADES (LOZÈRE) ON DEC. 4 AND 11, 1943. (Les chutes de neige colorée observées à Chasseradès (Lozère) les 4 et 11 décembre 1943; Text in French). Météorologie, [22]: 144-158 incl. maps, April-June, 1946. 4 refs.
DWB, M(05) S678MM, 1946

The origin of the blue snow was investigated. The temperature near the ground was just above 0°C. The blue coloring matter was attached to the dry falling snowflakes and the blue tint spread through the snow cover. The blue snow was not attributable to any known biological or meteorological phenomenon but to a chemical substance highly soluble in water. Methylene blue released from a high location in the 1945-46 winter during a snowstorm under conditions similar to those prevailing on Dec. 4 and 11, 1943 reproduced a similar effect. It is suggested that the blue snow was caused by the release of methylene blue from an airplane.

SIP U5973

Dinkelacker, Otto
THERMAL MAGNITUDES AND THEIR FUNCTIONAL DEPENDENCY FOR ICE, WATER, AND WATER VAPOR AT THE TEMPERATURES OCCURRING IN THE FREE ATMOSPHERE. (Thermische Grössen und ihre funktionelle Abhängigkeit für Eis, Wasser, und Wasserdampf bei den in der freien Atmosphäre vorkommenden Temperaturen; Text in German with French summary). Wiss. Arbeiten deut. Meteorologischen Dienstes Französischen Besatzungsgebiet, 1:24-33 incl. tables, graphs, 1947.
DLC, QC851.G77, v. 1

Approximate curves for the specific heat of the individual phases in the range 0° to -273°C are developed from the known precision measurements of the specific heat of water and water vapor at 0°C, and of that of ice up to -273°C. The heat of condensation or evaporation of supercooled water and the sublimation heat of H_2O-ice are calculated using the phase transformation equations of Kirchhoff and Clausius-Clapeyron. The functions of saturation pressures over water and ice are derived from these. A relationship between the saturation pressure over water and the maximum vapor pressure over ice is given.

SIP U5974

Schopper, Erwin
A DIRECT INDICATING HYGROMETER BASED ON THE DEW POINT METHOD. (Über ein direkt anzeigendes Feuchtigkeitsmessgerät nach der Taupunktsmethode; Text in German with French summary). Wiss. Arbeiten deut. Meteorologischen Dienstes Französischen Besatzungsgebiet, 1:138-144 incl. illus. diagrs. 1947. 6 refs.
DLC, QC851.G77, v. 1

Laboratory experiments indicate the superiority of the dew-point method for hygrometry at low temperatures. An automatic dew-point hygrometer is described which gives a direct visual indication of the relative humidity and air temperature. The Al-mirror surface is automatically maintained at the dew point. A closed-cycle optical-mechanical system maintains a rate of heating of the mirror surface. The instrument is designed for installation in airplanes, with the dew-point mirror placed in the free air stream of the airplane. Windtunnel and airplane tests to temperatures of -25°C show that the dew-point method can be expected to func-

tion down to temperatures of -70°C. Investigations at low temperatures must be made to determine whether the dew forms at ice or water saturation. A compensation thermometer is used in conjunction with the instrument to automatically compensate for aerodynamic effects.

SIP U5975

Wall, Ernst
ON THE FORMATION OF SNOW CRYSTALS I. (Über die Entstehung der Schneekristalle I; Text in German with French summary). Wiss. Arbeiten deut. Meteorologischen Dienstes Französischen Besatzungsgebiet, 1:151-179 incl. illus. tables, graphs, diagrs. 1947. [20] refs.
DLC, QC851.G77, v. 1

Systematic snow investigations made at the Aerological Observatory Friedrichshafen in 1940-1943 are published for the first time. Snow particles from supercooled fogs were studied and excellent results were obtained concerning crystal properties, and the microphysical cloud processes. The morphology of snow crystals is analyzed on the basis of a temperature-dependent crystal-form development. Theoretical interpretations are given to explain the degree of crystal growth, and a growth number, analogous to Reynold's number of flow processes, is derived for classifying the growth forms.

SIP U5976

Savchenko-Bel'skiĭ, A.
SNOW BLACKENING BY AIRCRAFT FOR RETENTION OF MELTWATER. (Zachernenie snega s pomoshch'ſu samoleta dlſa zaderzhaniſa talykh vod; Text in Russian). Sovetskaſa Agronomiſa, 9, No. 2: 76-79 incl. illus. 1951.
DLC, S13.S88, v. 9

Snow-blackening experiments were carried out during 1940-41 by the Bashkir Agricultural Station. Ashes strewn over the snow cover caused rapid snow melting and better water infiltration into the soil. Ash-strips were spaced 50 m. apart by aircraft in 1950 over large areas in Kuybyshev province. Subsequent meltwater-retention decreased erosive processes.

SIP U5977

Errera, J.
DISPERSION OF HERTZIAN WAVES IN SOLIDS NEAR THE MELTING POINT. (La dispersion des ondes hertziennes dans les solides au voisinage du point de fusion; Text in French). J. phys. radium, 5:304-311 incl. tables, graphs, Oct. 1924. 11 refs.
DLC, QC1.J8, v. 5

The variations of the dielectric constant of ice and other solids with phase change, temperature, and frequency at temperatures near the m.p. are discussed. The dielectric constant increases at any temperature with the wave length. This increase is large at the m.p. but small at low temperatures. The dielectric constant during solidification decreases at high frequencies and increases at low frequencies. Two separate phenomena, the movement of particles and the movement of electrons within each particle contribute to the dielectric polarization. Their relative importance varies with temperature and frequency, the first effect being negligible at low temperatures. Water and ice molecules are probably similar at the m.p.

SIP U5978

Alps, H. F.
FOOT-LAYER DENSITIES OF SNOW. Monthly Weather Rev. (U. S.) 50:474-475, illus. tables, Sept. 1922. 2 refs.
DLC, QC983.A2, v. 50

Results of snow-density investigations at Summit (Calif.) from 1916-1921 are presented. Snow densities of 1-ft. layers from the ground up were determined and tabulated to verify Wengler's formula. The density of the entire snow cover cannot be determined from the density of the surface layer. A lack of uniformity in density due to weather conditions during accumulation was noted. The relative position of certain ice crusts at different times proves that the snow disappears simultaneously from the bottom and top of the layer. The monthly mean density of the snow cover for the 5-yr. period is given and increases from 32-54% of equivalent water from Dec. to May.

SIP U5979

Korhonen, W. W.
A SIMPLE SNOW DENSITY METER. (Ein einfacher Schneedichtemesser; Text in German). Meteorologische Z. 39:180-182 incl. tables, June 1922.
DLC, QC851.M3, v. 39

The device consists of a cylinder 50 cm. in height, with a cross section of 100 sq. cm., a shovel, a sliding weight balance, and a hook by which the cylinder is attached to the balance. The lid of the cylinder serves as a bottom after the snow sample has been cut in the prescribed manner, and is weighed. The structure of different snow layers is also readily studied with the instrument. Results of measurements made with the instrument in Finland at the end of Jan. in an unprotected field and in thick woods or in larger clearings are given. The density varied from 0.241-0.260 in the clearings. The water content of the snow in the field was less than in the protected places, despite greater density, because of smaller snow depths. The influence of thawing weather predominates in mild winters, whereas in cold winters the variations in snow accumulations are more important.

SIP U5980

Hansen, W. J.
ICE CONDITIONS AND OTHER FACTORS RELATED TO THE OPENING AND CLOSING OF NAVIGATION ON THE HUDSON BAY ROUTE. 29p. incl. tables, map, Feb. 1949. (Address: Annual Meeting, Hudson Bay Route Assoc., Prince Albert)
DN-HO, VK800 Hansen

A summary of facts affecting the possible increase of the navigation season on the Hudson Bay route is presented. Ice conditions, visibility, winds, and the causes of past casualties are investigated. Ice forms along the Hudson Bay shores in early Nov., in bays and at the mouths of rivers by the end of Nov. and breaks up in June. The ice is about 3-4 ft. thick and extends off the east shore for 60-70 mi. to include the islands, and from 1-5 mi. in the rest of the bay. Large floes, broken from the shore ice by winter gales often form rafted ice 20-30 ft. thick which remains in the southern part of the bay until July. The central part of the bay does not freeze over. Hudson Strait ice is derived from Baffin Bay, Arctic, and Fox Channel ice and from locally formed winter ice. The earliest and latest dates for navigation of the Hudson Bay are dependent upon the presence of slob or slush ice at Churchill. The possible combination of slob, river, and tidal basin ice running with the ebb tide through Churchill Harbor from Oct. 10 in any year presents dangers to anchored vessels. Icebergs, growlers and ice conditions off Resolution Island are discussed. Ice formation near Nottingham Island and Cape Hopes Advance are analyzed.

SIP U5981

Hosler, Charles L.
AN EXPERIMENTAL STUDY OF THE EFFECTS OF AEROSOLS OF A NUMBER OF PURE CHEMICALS ON THE FREEZING CHARACTERISTICS OF SUPERCOOLED LIQUID DROPLETS. Progress Rept. No. 5, Penna. State Coll. Div. Meteorology, 12p. graphs, March 15, 1953. (Contract No. AF 19(604)-140)
SIPRE files

Ice-forming properties of NaCl, AgI, and NH_4I were tested. The concentration of salt in solution in the droplets affects the freezing temperature of the droplets in the same manner as freezing in capillaries. The fog apparatus consists of a cloud chamber, evacuating and filtering equipment, a sampling device, measuring and recording apparatus, and a commercial deep-freeze unit. The fog-tube technique for detecting ice formation in fogs appears practicable. The type of cloud formed within the cloud chamber is determined by measuring the rate of decay as indicated by the percentage change of light transmission through the cloud. A rapid rate of decay indicates supercooled water droplets; a slow rate, ice crystals. Typical traces of a supercooled water droplet cloud and an ice crystal cloud are presented.

SIP U5982

Hosler, Charles L.
AN EXPERIMENTAL STUDY OF THE EFFECTS OF AEROSOLS OF A NUMBER OF PURE CHEMICALS ON THE FREEZING CHARACTERISTICS OF SUPERCOOLED LIQUID DROPLETS. Progress Rept. No. 6, Penna. State Coll. Div. Meteorology, 8p. incl. illus. graphs, June 15, 1953. (Contract No. AF 19(604)-140)
SIPRE files

Investigation of NH_4I and NaCl conclude the experiments with solution droplets on a surface. Qualitative results obtained are similar to those obtained with these chemicals in capillaries. Analyses of the traces obtained from the fog tube indicate that at temperatures below -40°C there is an apparent change from vapor to solid without passing through the supercooled liquid stage, while at higher temperatures the liquid phase occurs before the crystals appear. (Author's abstract)

SIP U5983

Aliverti, G.
EXPERIMENTS WITH THE MOVEMENT OF VISCOUS FLUIDS IN OPEN CHANNELS. (Esperienze sul movimento di fluidi vischiosi in canali aperti; Text in Italian). Boll. Comitato Glaciol. Ital. No. 6:26-34, table, graphs, 1925. 1 ref.
DGS, 250(550)qC73, No. 6

Experiments were conducted to verify the theoretical results obtained by Somigliana for determining glacier depth on the basis of the surface downflow velocity. The viscosity coefficients of a solution of rosin dissolved in turpentine were calculated with the method of Stokes and on the basis of the formulas of Somigliana applied to a semi-circular channel and to symmetrical and asymmetrical channels of different profiles and inclinations. The relative equations are presented, and the values for densities, temperatures and viscosity coefficients tabulated. It is concluded that the viscosity coefficients determined by both methods are in good agreement, indicating that Somigliana's method may be applied for determining the depth of a glacier. The similarity of the curves observed in the experiments with glacial curves proves that glacier ice movement may be assimilated to the flow of a viscous fluid.

SIP U5984

Corps of Engineers. Office of the Chief of Engineers
AIRFIELD PAVEMENT DESIGN. FROST CONDITIONS. 11p. graphs, map. (In: Engineering Manual for Military Construction, Part XII, Ch. 4). April 1951.
SIPRE files, S-2089

Specialized frost terms used are defined. Pavements should be designed to prevent interruption of traffic due to the heaving and the loss of strength of subgrade and pavement resulting from frost action. The conditions necessary for ice segrega-

tion are reviewed. Temperature, frost susceptibility of soils, depth of frost penetration, and level of water table should be investigated before building airfields. The base composition requirements and the design of pavements are discussed. Examples of pavement design are given.

SIP U5985

Corps of Engineers. Office of the Chief of Engineers
AIRFIELD PAVEMENT DESIGN. CONSTRUCTION OF AIRFIELDS ON PERMANENTLY FROZEN GROUND. 20p. incl. graphs, map, diagrs. (In: Engineering Manual for War Department Construction, Part XII, Ch. 7). Oct. 1946.
SIPRE files, S-2089e

The principles underlying airfield construction in permafrost areas of fine-grained soils are presented. Frost terms used are defined. The design of airfields and roads over permafrost are based on the insulation and preservation of the permafrost in its frozen state. The general location of a building is dictated by its relationship to other buildings in the project but the exact site is determined after a study of stability of foundation material and movement of ground water. Air circulation must be provided and controlled between the floor and the foundation material. Frost-action material beneath the building in the frost zone is removed and replaced with non-frost-action material such as gravel or crushed rock. Treated timber and concrete piling are satisfactory; the minimum penetration of piles in the permafrost should be twice the thickness of the frost zone. Utilities are best placed together in an insulated conduit above or below ground.

SIP U5986

Ohti, Siro
ON THE FREEZING OF RIVERS IN KOREA AND SOUTHERN MANCHURIA. 9p. tables, graphs. (In: Articles on River and Sea Ice in Korea and South Manchuria, with temperature and weather data; data forwarded by Naval Forces, Far East, July 16, 1951). (typed ms. dated July 18, 1925)
DN-HO, GB2410 Korea

The date of formation of drift ice, complete freezing, thawing, and disappearance of drift ice are tabulated for the Liao Ho from 1904-1925. Total freezing was absent in 3 winters separated by an 8-yr. interval. Dates of freezing at Yongampo at the mouth of the Yalu, Chunggangchin on the upper Yalu, Pyongyang on the lower Taidong, Seoul on the Han and Yongdong 60 mi. upstream from the mouth of the Tuman are tabulated. The influence of pressure patterns on the freezing and melting in the Liao Ho are discussed. A study of the minimum temperature prevailing during the 2 days preceding river freezing reveals that this temperature was below -20°C in 10 winters, between -15° and -20°C in 8 winters, with the highest, -12.4°C occurring in 1923-24. Days with minimum temperatures above -10°C (occasionally above 0°C) after the start of drift ice are apparent during winters when complete freezing did not occur. The relation between the freezing of the Liao Ho and the snowfall over Mt. Tatum, Formosa is discussed.

SIP U5987

Mertz, Ellen Louise
FROST SUSCEPTIBILITY OF SOILS. (Jordarternes frostfarlighed; Text in Danish). p.34-37 incl, graph, diagr. (In: Vekselvirkningen mellem geologi og geoteknik, by Ellen Louise Mertz, Copenhagen, Danmarks Geologiske Undersøgelse, Ser. 3, No. 29, 1949). 24 refs.
DGS, (585)B ser. III, Nr. 29

The tendency of a soil to freeze depends upon its capillarity. The capillarity decreases with decreasing particle size, but the time necessary to supply water to the freezing layers also increases. Laboratory investigations on frost susceptibility may be made either directly under refrigeration or indirectly by determining capillarity. The selection of material for road and railway embankments is discussed.

SIP U5988

Rundberg, G. and Bengt Lambert
WINTER SANITATION. (Vinterhygien; Text in Swedish). Tid. Militär Hälsovård, 77:78-89 incl. illus. diagrs. 1952. 1 ref.
DLC, UH201.T5, v. 77

Military designs for latrines in winter camps are discussed. Proper site-selection to prevent the pollution of streams and rivers is stressed. The unburnable waste should be covered by ashes and/or snow when the camp is moved.

SIP U5989

Stav, Bjarne
SNOW REMOVAL ON ROADS. (Brøyting; Text in Norwegian). Medd. Vegdirektøren, No. 6:83-89 incl. illus. tables, 1948.
DPR, Unclassed

Various plow designs are discussed in relation to snow conditions in various parts of Norway. No special type of plow seems to be favored since local factors must be considered in each case. Snow removal practices in Norway are compared with Swedish methods. An organization of the highway network to improve utilization of snow removal equipment and manpower is recommended.

SIP U5990

Br.
SNOW-FLYER ROTARY SNOWPLOW. ("Sno-flyr" roterende snøplog; Text in Norwegian). Medd. Vegdirektøren, No. 2:33-35, Feb. 1948; 49, March 1948. diagr. incl. illus.
DPR, Unclassed

Experimental snow removal operations from airfields, streets, and highways using the American Snow-Flyer and the German Peter type of rotary snowplows, were conducted in Norway. The Snow-Flyer cut through a 1.05-m. high snow profile which was wet on the surface, granulated within and frozen hard at the bottom, at a speed of 1.9 km./hr., removing 81 cu. m. of snow or 25.1 tons/min. It is concluded that the Snow-Flyer excels the German model in performance and mobility, but the latter is preferred for opening high-mountain roads in the spring, since it is capable of removing deep snow more rapidly.

SIP U5991

Goldovskiĭ, B. M.
SLIDING OVER SNOW. (Skol'zhenie po snegu; Text in Russian). Priroda, 42, No. 6:85-87, 1953.
1 ref.
DLC, Q4.P8, v. 42

The decrease of the sliding coefficient under ski surfaces is usually explained as a result of pressure, which causes the formation of a meltwater layer between skis and ice or snow surfaces. Friction, rather than direct pressure, is considered the correct reason for the production of a meltwater layer. A specific pressure of a ski surface near 15 gm./sq. cm. might form a meltwater layer near the f.p., but good skiing was observed at temperatures of -20°C, when direct pressure is insufficient to raise the temperature of the snow surface above -0.12°C. The friction coefficient was 5 times higher at a temperature of -140° than at 0°C. Cu or steel edges on the skis decreased the friction coefficient at temperatures not lower than -3°C. Waxed wooden skis with low thermal conductivity have half the friction coefficient of skis with metal edges at temperatures near -35°C.

SIP U5992

Shvetsov, P. F.
DEFINITIONS OF SOME TERMS IN PERMAFROSTOLOGY. (K opredeleniiu nekotorykh ponîatiĭ v merzlotovedenii; Text in Russian). Izvestiîa Akademii Nauk SSSR, Seriîa Geograficheskaîa, No. 5:83-87, 1951.
DLC, AS262.A6246, 1951

Cryosphere is defined as the region of sub-freezing temperatures on the earth's crust including glaciers, ice, snow cover and the upper layer of the atmosphere. Soils are rated as constituents of the cryosphere even if only a part of the water is present in the solid state. Definitions of freezing, and of frozen and unfrozen ground by Soviet permafrostologists are discussed. Frozen ground is classified according to its time of existence, as eternal or permafrost (3 to many thousands yr. duration), 1-2 yr. duration, seasonal, and short duration. Other terms for permafrost, frost zone of the lithosphere and continuous frost are discussed. Permafrostology is viewed as a science of heat flow during cooling and freezing, heating and thawing of the upper layer of the lithosphere, together with accompanying mechanical actions of agents inside and on the surface of the earth's crust

SIP U5993

Reina, Vincenzo and Carlo Somigliana
OBSERVATIONS AND MEASUREMENTS ON THE GLACIERS OF THE SOUTH-EAST SLOPE OF MT. ROSA. (Osservazioni e misure sui ghiacciai del versante Sud-Est del Monte Rosa; Text in Italian). Boll. Comitato Glaciol. Ital. 3:165-190 incl. illus. tables, diagr. appendix, 1918. 7 refs.
DGS, 250(550)qC73, No. 3

Rectilinear measurements are insufficient for determining glacier growth and recession. The determination of variations in the glacier mass requires the taking of reliefs. This method is impractical for the comparative study of several glaciers and attempts have therefore been made to determine glacier variations by indirect means. It is suggested that elements common to groups of glaciers could be found as indices for the quick determination of variations. Such elements could include the height of the extreme ends and the mean elevation of the glacier tongue, the level of the snow limit, glacier surface sections and snow profiles. The determination of the glacier thickness from the surface flow velocity was attempted by Werenskiold by assuming that the glacier velocity distribution is analogous to that of a fluid. This theory requires further development of the mechanical theory of glacier movement. The studies conducted on Mt. Rosa in 1918 included triangulations, tongue and surface velocity measurements and relief observations on 6 glaciers. Measurement results are presented.

SIP U5994

Gol'tsman, M. I.
MEASUREMENTS OF ATMOSPHERIC HUMIDITY AT LOW NEGATIVE TEMPERATURES. (Ob izmerenii vlazhnosti vozdukha pri nizkikh otritsatel'nykh temperaturakh; Text in Russian). Problemy Arktiki, No. 1:39-53 incl. illus. graphs, diagrs. 1939. 8 refs.
DLC, G600.P7, 1939

Low water vapor content at air temperatures below -20°C requires careful measurement of humidity, which is impossible by ordinary methods. The dew-point method has some theoretical indefinites, and with air temperatures below -20°C the change of dew-point temperature is insignificant. The psychrometric method can be recommended for the usual measurements of humidity at low air temperatures. Satisfactory results were obtained with an electrical psychrometer constructed by the author. Copper spheres of 4 mm. diam. with thermocouples were placed on a celluloid ring of a Duralumin coil. The lower series of spheres was sprayed with water, and the thermal differences were measured by a mirror galvanometer. The instrument is recommended for control measurements of humidity at low temperatures.

SIP U5995

Hays, James B.
USE OF SALT IN CLAY CORE AIDS WINTER DAM BUILDING. Eng. News-Record, 151, No. 6:41 incl. illus. diagr. Aug. 6, 1953.
DLC, TA1.E61, v. 151

The addition of NaCl will protect clay against freezing. One percent (by weight of the clay) of salt affords protection down to 10°F, 2% down to 0°F and 3% down to -10°F. The salt is added to the clay after the water has been added and during the processing operation.

SIP U5996

Hoinkes, H.
MICROMETEOROLOGY OF AN AIR LAYER NEAR THE ICE SURFACE. (Zur Mikrometeorologie der eisnahen Luftschicht; Text in German with English summary). Arch. Meteorologie, Geophysik, Bioklimatologie, Ser. B. 4:451-458 incl. tables, graphs, 1953. 8 refs.
DLC, QC851.A732, v. 4

Results of wind and temperature distribution measurements within a surface air layer, approximately 2 m. thick, above ice are presented. The results are based on 2 series of measurements made over a period of several days on the Vernagt and Hornkees glaciers. The vertical distribution of wind speed and temperature is described by logarithmic formulas, which permit calculation of an exchange coefficient, and finally the calculation of the turbulent atmospheric heat current from air to ice by determining the thermal economy of the glacier surface. The exchange coefficient must be adjusted to the very stable thermal stratification of the air above the melting surface of the glacier, in accordance with the methods of Sverdrup or Lettau. The simultaneous measurement of ablation and radiation balance makes possible a direct control of the approximate quantity of heat supplied from the air. The good agreement of the exchange coefficient as obtained empirically and calculated by means of the theories of Sverdrup and Lettau leads to the conclusion that, within the air layer above an ice surface during summer where no thermal convection occurs, the exchange of turbulence, heat, and humidity appears to obey the same laws.

SIP U5997

[Allcut, E. A. and F. C. Hooper]
FIND HEAT PUMP WORKS IN ARCTIC. Sanit. Engr. 47, No. 7:33-35 incl. graph, diagr. July 15, 1953.
DLC, TH6101.S19, v. 47

A study of a heat pump installation in a 5-room home near Port Credit, Ont., in the Canadian arctic, and in a gold mining area of northern Ont. is presented. The heat pump or reverse cycle refrigeration uses heat recoverable from water, air, earth, or a source of waste heat. The heat pump for arctic use, utilizes lake water at 32°F available below the 8-ft. ice cover, yielding 144 B.t.u./lb. when freezing. A liquid-cooled 2-cylinder diesel engine rated at 15 hp. is used as power source. The pump is designed to meet the heating capacity of 130,000 B.t.u./hr. needed for a small station.

SIP U5998

Obruchev, V. A.
YELLOW SNOWFALL IN THE ZMEINOGORSK COUNTY OF THE TOMSK DISTRICT. (O zheltom snege, vypavshem v Zmeinogorskom uezde Tomskoĭ gub.; Text in Russian). p.276-281 incl. tables. (In: Izbrannye Raboty po Geografii Azii, vol. 3 by V. A. Obruchev, Geografgiz, Moscow, 1951)
DLC, GB281.029, 1951

A yellow snowfall which occurred on the night of Jan. 27-28, 1911 in some sections west of Altai at a temperature near 0°C is described. The 1-in. layer melted rapidly the following day. A microscopic examination of the snow showed the presence of round, colorless or yellowish grains which appeared as separate, largely colorless, opaque needles of 0.001-0.02 mm. size. Chemical analyses indicated that the composition of the dust contained mostly silicates and 1.05% water-soluble salts. The calculated volume of dust was 127,604 cu. ft.

SIP U5999

G--v, K.
STATIONARY ICEMETER. (Statsionarnyĭ ledomer; Text in Russian). Problemy Arktiki, No. 5-6:159-161 incl. diagrs. 1938.
DLC, G600.P7, 1938

A device used for the measurement of ice thickness at Cape Shmidt is described. A pipe of length greater than the maximum winter ice thickness was frozen into the ice at the beginning of winter. A rod passing through the pipe has a disc at the lower end. The pipe is filled with a mixture of kerosene and petroleum to prevent freezing. A cm.-measuring rod was installed over the ice cover. The disc rises as the ice thickness increases, indicating the increase on the rod.

SIP U6000

Gray, Dwight E. and John Sherrod, Jr.
ANNOTATED BIBLIOGRAPHY ON SNOW, ICE AND PERMAFROST. SIPRE Report 12, v. 4, July 1953. 360p.
SIPRE files

The bibliography contains 1500 abstracts on snow, ice and permafrost prepared by Library of Congress personnel. The abstracts are arranged in numerical order and are supplemented by an author and a subject index; a title index is included covering items for which the authors were unidentified. A cumulative subject index covering vol. 1-4 is appended.

SIP U6001

Kellogg, Charles E. and Iver J. Nygard
THE PRINCIPAL SOIL GROUPS OF ALASKA. Agr. Monograph No. 7; Dept. Agr. 138p. incl. illus. tables, maps, March 1951. 29 refs.
SIPRE files, S-1143

The definition, classification, and distribution of the principal soil groups in Alaska are presented. Tundra and podzol are the principal zonal soils. A new intrazonal soil group, the subarctic brown forest, is described. The general distribution of permafrost is mapped and the presence and depth of permafrost are tabulated for each principal soil group. Permafrost is likely to occur in the lower soils when the annual average temperatures are colder than 25°-29°F. Dry permafrost occurs when the ground layer is below freezing but lacks ice to cement the mass. Large tundra areas in northern Alaska have shallow permafrost tables, the tundra in the Aleutians lacks permafrost. The effects of permafrost on soil formation are discussed. The depth to which a soil over permafrost thaws in summer depends upon the cover, the type of soil, and the temperature. Permafrost is impermeable to water and the soil directly over the permafrost is always moist.

SIP U6002

Tikhomirov, E. I.
WINTER AIR HUMIDITY IN POLAR REGIONS AND RELATED PHENOMENA. (Zimnîâîâ vlazhnost' vozdukha v polîârnykh stranakh i sviazannye s neîû îavleniîâ; Text in Russian with English summary). Problemy Arktiki, No. 2:63-74 incl. tables, graphs, 1938. 11 refs.
DLC, G600.P7, 1938

The saturation of air with respect to ice is of great importance in polar regions at low air temperatures. A hair hygrometer used for humidity measurements indicates the humidity in relation to water only, because inside the hair the water remains in a liquid state even at low temperatures. Psychrometric measurements by F. Malmgren showed that the air in polar regions is usually near saturation in relation to ice. The frequent formations of hoarfrost and rime in polar regions are caused by supersaturation up to 10-20% in relation to ice. Fog formations are usually observed at hair hygrometer readings of less than 100%.

SIP U6003

Browett, Charles
FORMATION OF SNOW ROLLERS. Quart. J. Roy. Meteorological Soc. 34:87-96 incl. illus. graph, discussion, April 1908.
DWB, M(05) R888q, v. 34

Snow rollers formed near Coventry (England) after several storms of fine snow which left a mantle 1.5 in. deep, are described. The snow was cleared away to the bare grass in tadpole-like markings, the tail pointing against the wind and the swept snow piled in a roll at the head. The greatest length of any marking was 30 ft., the average 20 ft. and the smallest 6 ft. The width of grass cleared was 3 in. at the start and 12-17 in. at the widest part. The wind velocity was 25 m.p.h. from the north-northwest, the temperature 5 ft. above the ground was 32°-34°F during the night. The surface of the snow was flat and the rolls were made after the snow stopped; the edges were knife-sharp. Accounts and explanations by various observers are included. A snow roller at Orkney was 3 ft. long, 6.5 ft. in circumference and weighed 64 lb. The meteorological circumstances favoring their formation includes a recent fall of loose snowflakes in calm weather, followed by temperatures slightly above freezing to give adhesion and a strong wind to effect a combined rolling and lifting. They are much lighter than handpacked rolls, and many have a hollow core.

SIP U6004

Liverovskiĭ, ÎU. A.
FROST WEATHERING AND SOIL FORMATION IN THE TUNDRA. (O moroznom vyvetrivanii i pochvoobrazovanii v tundre; Text in Russian). Akademiîâ Nauk SSSR, Problemy Sovetskogo Pochvovedeniîâ, 7: 43-49, 1939. 15 refs.
DLC, S590.A65, v. 7

Frost weathering produces changes in relief or microrelief, and influences the distribution of the vegetative cover, soil processes, and constructions. Soil solutions in the arctic act as electrolytes. The soil colloids coagulate by increasing the salt concentration in the spring and summer. An increase of salt concentration conditions the migration of dissolved salts from the freezing part of the soil to the unfrozen part. Swelling of colloids occurs in spring and is one of the main factors causing the formation of structural soil in the tundra.

SIP U6005

Andrienko, N. T.
BUILDING FOUNDATIONS IN PERMAFROST. (Fundamenty zdaniĭ na vechnoĭ merzlote; Text in Russian). Stroitel'naîâ Promyshlennost', 18, No. 8:23-32 incl. table, graphs, diagrs. 1940. 15 refs.
DLC, TH4.S85, v. 18

Construction in permafrost is classified into industrial and civilian buildings on gravel- sandy and fine-earth soils respectively. The passive principle of construction was used with a minimum area of support and ventilation underneath the foundations. Experiences gained in the construction of electric power stations and administration buildings in Transbaikal, Sgarka and Dudinka in various soils with various temperature gradients, insulation, and properties are reviewed. Diagrams and graphs for various foundations indicate the necessity of a thorough knowledge of the permafrost character. The permafrost line retreated 8-15 m. under foundations in 7 yr. (Sgarka) with pilings sunk to 18 m. A building can rest on a preserved vegetative cover with a low water content (30-40%), but with greater moisture, an additional moss cover, 0.30-0.40 cm. thick and 2.5-3 m. wide, under and around the buildings is recommended.

SIP U6006

OST (ALL-UNION STANDARD) FOR THE LAYOUT OF FOUNDATIONS IN PERMAFROST REGIONS (REPLACING NO. 4544 EDITED IN 1932) (PLAN). (OST na ustroistvo osnovaniĭa i fundamentov v raĭonakh vechnoĭ merzloty [vzamen OST 4544 v redaktsii 1932 g.][proekt]; Text in Russian). Proekt i Standart, 6, No. 1:37-40 incl. tables, 1937.
DLC, TH4.P7, v. 6

Construction properties of soils and maximum loading on permafrost for different temperature and moisture conditions are listed. The force necessary to separate wood and concrete from soil at below freezing temperatures (adfreezing strength) for different soil moisture conditions are given. The adfreezing strength for wood at -1°C varies from 2-6 kg./sq. cm. and for concrete 1-5 kg./sq. cm. for soil ranging from 25-100% saturation; at -10°C the value varies from 3-16 kg./sq. cm. for wood and 7-13 kg./sq. cm. for concrete over the same moisture range. Intermediate data are obtained by interpolation. Engineering and geological investigations of construction sites with varying thickness of the active layer, and basic principles of construction techniques are proposed.

SIP U6007

Patton, Clyde P.
COOPERATIVE SNOW INVESTIGATIONS: FIVE-YEAR METEOROLOGIC SUMMARY. STATION 3, CENTRAL SIERRA SNOW LABORATORY. SIPRE Analytical Unit, 15p. tables, graphs, map, May 1, 1952. 2 refs.
SIPRE files, S-1129

Precipitation, temperature, snow-pack characteristics, and wind data from 1945-1951 are summarized. The total seasonal precipitation averages 51 in., and is concentrated in the winter months, a large portion of it falling when temperatures are below freezing. Snow-pack characteristics vary greatly from season to season. Snow depth and water equivalent vary much more than density. The average snow density increased gradually from 28-51% during the period of observation. The snow pack is at least 10 in. deep by Jan. 1 and increases 38-60% in depth during the days when the temperature remains below 32°F. The maximum depth of the snow pack varied from 86-124 in. with an average of 92 in., representing a water equivalent of 40 in. The snow pack depletes from 2.02-2.64 in./day after the last snowfall occurs and disappears between May 7-June 14.

SIP U6008

Horton, Robert E.
AIR CHIMNEYS OF ICE BELOW A WATERFALL. Monthly Weather Rev. (U. S.), 46:23 incl. diagr. Jan. 1918.
DLC, QC983.A2, v. 46

Air chimneys of ice below a waterfall from the Oswegatchie River dam near Gouverneur (N. Y.) are discussed. The chimneys were formed at an air temperature of -25°F on shore ice built from obstructions below the dam and from the toe of the dam. Air carried in the pool with the overflow from the dam rises through air holes in the shore ice. Mist and water drops carried with this air freeze around the air holes building up the chimneys. The tallest chimney was 4 ft. high with a 6 to 7-in. inside diam.; the largest was 2 ft. high with a 10 to 12-in. diam.

SIP U6009

Rees, D. B.
SNOW MAINTENANCE ON CANADIAN AIRPORTS. 6p. tables. (In: Symposium on Snow Removal and Compaction Procedures for Airfields. Research and Development Board. Com. Geophysics Geography, April 24-25, 1952)
SIPRE files, S-1091

Snow maintenance is performed on airports through clearing, compacting, or a combination of both. Snow clearing removes the snow entirely from the runway surface. Large 4-wheel drive trucks with hydraulically controlled one-way snowplows mounted in front are used as soon as 1-2 in. of snow has fallen. The plowed snow is thrown on the grass area in the center of the field and between runways by snow blowers, or loaded and hauled away to a dumping area. Snow is compacted where it falls. A crawler tractor towing a snow drag and a set of snow rollers is used as soon as the first 2 in. of snow has fallen. Snow drags stir the snow and remove the air; rollers compact it into a solid base cemented to the runway surface. Successive layers of snow are built up on this base throughout the winter. A depth of 2 or more ft. of compacted snow is reached by spring. Combined clearing and compaction keeps the compacted snow to a 5-in. depth, any excess being removed by snowplows and blowers. Operating costs of snow maintenance at various airports are tabulated. (See also SIP U5126)

SIP U6010

Krylov, M. M.
THERMOTECHNICAL ANALYSIS OF SOIL FREEZING. (K teplotekhnicheskomu analizu promerzaniĭa grunta; Text in Russian). Vestnik Inzhenerov i Teknikov, 20:466-467 incl. graph, 1934. 2 refs.
DLC, TA4.V4, v. 20

The thermal balance of soil is conditioned by heating and cooling, humidifying and drying, and by freezing and thawing of the soil. A mathematical and graphical analysis of the balance is presented. The heat balance during the year has a value of 18,000 cal./sq. in. for soil with a vegetative or snow cover and 24,000 cal./sq. in. for bare soil. Most of the heat consumption (60%) occurs in the upper layer to a depth of 1.6 m. A large heat consumption is related to moisture changes in the soil due to the high latent heat of evaporation. The heat loss for soil containing 300 kg. water/1 cu. m. by freezing to a depth of 1.5

m. is calculated to be 36,000 cal./sq. in., a value 3-4 times larger than the annual heat balance from temperature changes. Frost penetrating to a depth greater than 2 m. produces conditions favorable for permafrost formation.

SIP U6011

Tsurikov, V. L.
SOME DATA ON ARAL SEA ICE. (Nekotorye dannye o l'de Aral'skogo morfa; Text in Russian). Izvestiia Gosudarstvennogo geograficheskogo Obshchestva, 71: 1200-1219 incl. tables, graphs, maps, diagrs. 1939. 18 refs.
DLC, G23.R6, v. 71

The process of ice formation, the growth of ice thickness, ice structure, various forms of ice accumulation, and processes of ice disintegration and melting were studied in the northern part of the Aral Sea in the winter of 1935-36. Ice begins to form at the shore line in wind-protected places at -0.54°C. Round, light-textured pancake ice, 0.3-0.4 m. thick, forms later. Snow precipitation and frazil ice contribute to a dull-gray ice formation and lower the trafficability. The cooling of the water up to the f.p. occurs without convection. Ice stratification is caused by salinity variations and air temperature fluctuations. A regularity was observed in the formation of fissures near the shore.

SIP U6012

Zamorskiy, A. D.
LARGE SNOWFLAKES. (Snezhnye khlop'ia-velikany; Text in Russian). Priroda, 35, No. 3:58-59, 1946.
DLC, Q4.P8, v. 35

Snowflakes up to 8 cm. long fell on April 30, 1944 in Moscow for more than 1 hr. The flakes were mostly of a conical form and fell slowly with a rotary motion. The temperature of 1°-2°C near the soil surface remained positive up to 200 m. The snowflakes are attributed to temperatures near 0°C and an unstable state of the atmosphere caused by invasion of arctic air. The phenomenon is a confirmation of the hypothesis concerning the dependence of snowflake size on temperature and stability of air masses.

SIP U6013

Griffin, Alfred A.
INFLUENCE OF FORESTS UPON THE MELTING OF SNOW IN THE CASCADE RANGE. Monthly Weather Rev. (U. S.), 46:324-327 incl. illus. tables, graph, July 1918. 1 ref.
DLC, QC983.A2, v. 46

Snow melting in open, logged-over areas and in the forested areas of Tumalo Creek in central Oreg., Wind River in southern Wash. and Yakima River in central Wash. was compared during a 2-yr. period. Snow stations were located in the open and in the forest in pairs, both stations being similar in all important respects except forest cover. Snow

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depth, density, and distribution of the snow cover were observed throughout the melting season at 8-20 stations in each area. Snow remains an average of 17 days longer in the forest, drifting is more apparent on the open high ridges, and the snow cover is deeper in the open. The depth of snow retained during the latter part of the melting season is greater in the forested area. About 30% of the maximum snow blanket was still retained in the forested areas when the open areas became bare. The snow is deepest and lasts longest in small openings of the denser forests.

SIP U6014

Bentley, William A.
PHOTOMICROGRAPHS OF SNOW CRYSTALS, AND METHODS OF REPRODUCTION. Monthly Weather Rev. (U. S.), 46:359-360, illus. Aug. 1918. 4 refs.
DLC, QC983.A2, v. 46

Retouching of photomicrographs, when dust particles or snow-crystal debris which have fallen on the faces of tabular crystals cannot be removed, is defended. Transparency, evaporation and snow debris cause the chief photomicrographic difficulties. The blocking-out method of cutting the film of the negative away from the snow crystal image allows its reproduction in white on a dark ground.

SIP U6015

Dudkin, P. A.
METHODS OF WINTER AIRFIELD OPERATIONS. (O metodakh zimnei ekspluatatsii aerodromov; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:13-27 incl. illus. table, diagrs. 1943.
DLC, TL725.3.C6R8, No. 8

War experience showed that better results were obtained on airfields by joint use of snow compacting and snow removing methods. The preparation of airfields for operations by snow compacting is less time consuming. Compacted landing strips are less visible from the air, but airfields with only snow-compacted areas cannot operate during thaw weather and spring snow melt. Snow removal is more laborious, but caused deeper soil freezing and freezing of the grass cover. Snowdrifting is considerable on snow-free strips. Snow compaction methods at the beginning of winter are recommended for regions with a stable cold winter. Snow removal and compaction equipment used and a description of the compacting and removing procedure are included.

SIP U6016

Bichkin, E. I.
SNOW REMOVAL FROM AIRFIELDS BY SCRAPERS. (Raschistka aerodromov ot snega pri pomoshchi volokuch; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:28-31, 1943.
DLC, TL725.3.C6R8, No. 8

About 200 devices for removing snow from airfields were exhibited by the Air Force. Experience during the 1941-42 winter showed that scrapers are most effective removing snow at rates up to 120 cu. m./hr. A simple and efficient scraper was shown consisting of a wooden rectangle with a blade as the front piece, and which is pulled by a tractor. The lateral walls are removed to unload the snow.

SIP U6017

Gusev, G. I.
WINTER AND SPRING OPERATIONS OF AIRFIELDS. (Zimnîaîa i vesennîaîa ekspluatatsiîa operativnykh aerodromov; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:32-38 incl. illus. 1943.
DLC, TL725.3.C6R8, No. 8

Relief, prevalence of lakes and swamps, difficulties in grass cover cultivation, low bearing strength of soil surface caused by intensive autumn soil moistening and long winters with deep snow cover, frequent snowstorms and thaw weather determine operating conditions of northern airfields. Better winter operating results were obtained by using snow compaction and removal methods. Snow compaction was started in the winters of 1941-1943. The compacted snow layer remains 4-8 cm. thick. Fresh snow was removed by scrapers of various designs and other simpler devices. Snow fences were used for snowdrift prevention. Complete snow removal was started in March, when the snow was first plowed and then removed in layers. Special harrows pulled by tractors scarified the 3 to 4-cm. ice crust at a rate of 300-400 cu. m./hr.

SIP U6018

Gurinov, A. A.
SNOW REMOVAL ATTEMPTS FROM AIRFIELDS BY SCRAPERS. (Opyt ochistki aerodromov snegotaskami; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:38-42 incl. illus. diagrs. 1943.
DLC, TL725.3.C6R8, No. 8

Three types of scrapers used in winter operations for 1942-43 are described. Wooden designs of V- and X-forms were used for snow removal from runways. Pulled by a tractor, they cleared 6-8 cm. of snow from 4-6 ha. in 10 hr. Other scrapers removed snow in layers of 1-2 cm., hauling about 60-70 cu. m. each load. Scrapers equipped with metal blades removed 1 to 2-cm. layers of highly compressed snow without difficulty.

SIP U6019

Lysenkov, L. V.
WINTER AIRFIELD OPERATIONS ON THE FAR EAST FRONT. (Zimnîaîa ekspluatatsiîa aerodromov DVF; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:46-47, 1943.
DLC, TL725.3.C6R8, No. 8

Snow conditions at the front varied from a maximum snow cover less than 10 cm., to one of 2-m. depth. Snowstorms lasting up to 10-15 days rendered snow removal impossible. An attempt to remove snow from a concrete runway failed because frost penetration into the soil, usually 50-60 cm., increased to 2 m., and underground waters caused intensive frost heaving. Winter experiences of 1942-43 indicated the great importance of snow removal from runways immediately before spring thaw.

SIP U6020

Mizirenkov, A. V.
WINTER AIRFIELD OPERATIONS IN THE VOLGA MILITARY DISTRICT. (Zimnîaîa ekspluatatsiîa aerodromov Privolzhskogo Voennogo Okruga; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:48-49, 1943.
DLC, TL725.3.C6R8, No. 8

Snowdrifts and strong winds up to 25 m./sec. adversely affect airfield operations in the Volga District. Snow fences retained up to 35 cu. m. of snow for each sq. m. of fence area. Snow compaction of runways was an effective measure because the snow-melting period is short due to solar radiation and strong winds, which also cause rapid evaporation of the meltwater.

SIP U6021

Lovtsov, N. G.
WINTER OPERATIONS OF AIRFIELDS IN THE NORTHERN REGIONS. (Zimnîaîa ekspluatatsiia aerodromov v severnykh ralonakh; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:49-50, 1943.
DLC, TL725.3.C6R8, No. 8

Winter experiences of 1942-43 showed the great importance of snow removal from runways. Runways compacted for winter use became inoperative for extended periods only during thaw-weather periods in winter and in the spring. Better results were obtained by using 2 types of runways, one type for the snow-melting period and the other for summer use. The snow on spring runways must be compacted up to a thickness of 15 cm., and the snow on summer runways is completely removed before melting. Deeper soil freezing under the snow-free surface necessitates good ground drainage.

SIP U6022

Cherkasov, I. I.
SOIL DRAINAGE DURING SPRING THAW. (Vodootvod pri vesennem raspute; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:53-62 incl. diagrs. 1943.
DLC, TL725.3.C6R8, No. 8

Infiltration of snow meltwater into soil considerably decreases the bearing strength of the soil surface, and might close airfield runways for extended periods. The prevention of water inflow from adjacent areas

and the decrease of meltwater quantities by complete snow removal before melting are necessary measures. Various drainage systems are described. Trench construction in snow is recommended for prevention of soil erosion and more rapid meltwater run-off.

SIP U6023

Kragel'skiĭ, I. V.
OPTIMUM CONDITIONS OF SNOW PREPARATION. (Opredelenie optimal'nykh usloviĭ obrabotki snega; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:67-88 incl. tables, graphs, diagrs. 1943.
DLC, TL725.3.C6R8, No. 8

Physicomechanical properties of the snow cover essential for airfield construction and operations were investigated. Processes increasing the bearing capacity of the snow cover were studied. Experiments showed that the hardness of snow depends on temperature. A snow cover with a density of 0.5 has sufficient supporting power at temperatures of -5°C and lower. Runways at temperatures near 0°C are used if the snow density is not less than 0.55. Snow compaction increases the density of the snow cover, but the increase is limited by temperature. Snow compaction equipment may compress the snow cover to densities of 0.55-0.58 at temperatures near the f.p. or up to 0.46-0.48 at temperatures near -20°C. Mixing the snow destroys the structure of snow crystals and considerably increases the bearing capacity. The hardening processes in the snow continued many hours after application of pressure. Better results are obtained when the snow is compacted in thin layers, because the tension in snow rapidly decreases with depth. Scrapers with rounded blades are more effective for snow compaction than straight-edged blades.

SIP U6024

Shakhov, A. A.
THE DENSITY AND BEARING CAPACITY OF A SNOW COVER. (Plotnost' i nesushchaia sposobnost' snegovogo pokrova; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:89-98 incl. tables, graphs, 1943.
DLC, TL725.3.C6R8, No. 8

The dependency of the bearing capacity of a snow cover on temperature, density, and specific pressure, as well as measures for increasing the capacity were studied during the winter of 1942-43. Investigations showed an increase of bearing capacity with decreasing snow temperature and increasing snow density. The bearing capacity continued to increase for 4-10 hr. after snow compaction. The duration of the period increased with specific pressure applied to the snow surface and with a decrease of snow temperature. Better results might be obtained when the snow is compacted at air temperatures near -1° to -5°C. Snow compaction at temperatures of -14°C and lower is difficult. A considerable increase in capacity was observed when snow compaction was accompanied by intensive snow mixing. A time interval of 1-2 hr. is necessary for repeated snow compaction.

SIP U6025

Petrashev, A. P.
INFLUENCE OF AIRFIELD WINTER OPERATIONS ON A GRASS COVER. (Vliianie sposobov zimneĭ ekspluatatsii aerodromov na perezimovku trav; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:99-102 incl. tables, 1943.
DLC, TL725.3.C6R8, No. 8

Snow compaction and removal from airfields considerably alters the thermal conditions of the soil, which often destroys the grass cover. Special experiments were conducted during 1942-43 to investigate these influences. Four strips were prepared on an experimental plot. The first was left snow-free throughout the winter. The snow cover was regularly compacted over the second and third strips, and the snow cover on the fourth strip was left in a natural state. The snow density was 0.24 for the fourth strip and 0.45 for the snow-compacted strips. The maximum frost penetration into soil was 55 cm. under snow-free surface and 35 cm. under the snow cover. The soil thawed completely 2 weeks earlier under the snow-free surface. Tables indicate the frost-resistance of various grass species. Soil fertilization increases the frost-resistance of grass.

SIP U6026

Miaskov, V. A.
PREPARATION OF AIRFIELDS FOR WINTER OPERATIONS. (Metody podgotovki aerodromov k zimneĭ ekspluatatsii; Text in Russian). Sbornik materialov po stroitel'stvu i ekspluatatsii aerodromov, No. 8:102-113 incl. table, 1943.
DLC, TL725.3.C6R8, No. 8

Four main zones, based on peculiarities of snow cover and temperature distribution exist in European USSR. The first zone (north and northeast) includes a large forest area. Frequent snowstorms and thaws necessitate snow removal from airfields. In the second zone (west and southwest) the average snow-cover depth attains 37 cm. Snowstorms and thaws are frequent. Snow removal is important for continued service. Separate snow-free runways must be constructed when complete snow removal from airfields is impossible. The third zone (south) is characterized by scant winter precipitation, strong winds and frequent intensive thaws. Snow compaction will provide good airfield service. Northeastern, eastern, and southeastern regions are included in the fourth zone, where the average depth of the snow cover reaches 53 cm. with frequent snowstorms. The winter is long and without thaw weather. Snow compaction is an effective measure. Improved methods of snow compaction and removal are discussed.

SIP U6027

Barnes, Howard T.
THERMIT AND ICEBERGS. J. Franklin Inst. 203: 611-634 incl. illus. May 1927.
DLC, T1.F8, v. 203

The temperature difference between ice masses tightly bound and the same, loose and soft, is only 0.001°C. The penetrating power of the sun's rays unbinds the forces of freezing between ice crystals without melting them. This great penetration is due to the high temperature of the sun. Thermit, a mixture of Al grains and an iron oxide, which when fired produces a temperature of 2500°-3500°C in a few sec. was used as a high temperature source in experiments on ice control. Ice decomposes into O and H as soon as direct contact with the molten iron occurs, producing a slow explosion effectively loosening and cracking ice masses. Experiments with Thermit in icebergs are described. The action of the heat sets up a thermal expansion strain causing innumerable cracks and fissures through which the sun and melted ice water gain access.

SIP U6028

Gold, E.
WET BULB TEMPERATURES AS "THAW TEMPERATURES". Meteorological Mag. 64:11-12, Feb. 1929; 90-93 incl. tables, May 1929. 2 refs. (Correspondence)
DLC, QC851.M18, v. 64

The air temperature may rise 3-4°F above freezing without causing any thawing of frozen ground. The frozen ground acts as a wet bulb thermometer when moisture is present and will not thaw until the wet bulb temperature reaches 32°F. Readings of wet and dry bulb thermometers by J. E. Belasco are tabulated; they confirm the lack of thawing with a wet bulb temperature below and a dry bulb temperature above 32°F. Experiments to determine conditions promoting the freezing of supercooled water were conducted in cold chambers at air temperatures of 31° and 24°F. Supercooling can be arrested by the introduction of a freezing nucleus of ice or sawdust when the air temperature is well below freezing, but ice alone will promote freezing at temperatures just below the f.p.

SIP U6029

Kynett, Lawrence and John Lohner
CHEMICAL COMPOSITION OF RAINS AND SNOWS AT MOUNT VERNON, IOWA. Monthly Weather Rev. (U. S.), 57:461 incl. tables, Nov. 1929.
DLC, QC983.A2, v. 57

Seven specimens of snow, 37 of rain, and 2 of both rain and snow were collected in clean, granite pans of 17-in. diam. away from trees and buildings. Chemical analyses of the samples for Cl, NH_3, albuminoid NH_3, NO_3, NO_2 and SO_4 are tabulated in p.p.m. and lb./acre. The Cl source was attributed to the Atlantic Ocean or Gulf of Mexico. The SO_4 content was presumed to come from private coal heating plants.

SIP U6030

Büdel, Julius
THE ICE-WINTER 1945/46 AT THE GERMAN COASTS (BRIT. ZONE) COMPARED WITH THE ICE-WINTERS 1903/04 - 1942/43. (Der Eiswinter 1945/46 an den deutschen Küsten [Brit. Zone] im Vergleich zu den Eiswintern 1903/04 bis 1942/43; Text in German with English summary). Deut. Hydrographisches Inst. 20p. graphs, Jan. 2, 1947. 6 refs.
DN - HO, VK597 Ger S#34, 1947

Ice winters are classified into severe and mild winters according to the sums of the negative air temperatures, or according to the quantity of ice formed at this temperature. It is hypothesized that the position of a certain winter within these 2 scales varies, and the relation of meteorological winter to ice winter is investigated. Two new numerical expressions are defined: the cold values for the meteorological winter obtained from a specific calculation of the sum of daily mean temperatures below 0°C, and the ice sums obtained by adding the number of days with ice for each winter. Both values are computed for each of the 40 winters between 1903-1943, and are plotted and compared. The severe winters showed little variation, but the moderate and mild winters differed markedly. The causes for these differences are analyzed.

SIP U6031

Haley, James F.
COLD-ROOM STUDIES OF FROST ACTION IN SOILS, A PROGRESS REPORT. Highway Res. Board, Bull. No. 71:1-18 incl. tables, graphs, diagrs. 1953. 8 refs.
DLC, TE7.N28, Bull. 71

Results of studies by the Frost Effects Lab. from Feb. 1950-Oct. 1952 are given. Frost-action effects in soils were studied as related to grain-size distribution, initial density, overburden pressure, initial degree of saturation, rate of freezing, solidification temperature, clay mineral compaction, and admixtures. The intensity of ice segregation in soils is dependent on the percentage of grains finer than 0.02 mm. and on the grain-size distribution. The intensity of ice segregation is decreased appreciably in an increase in overburden pressure, all other factors being equal. Soils may be made less susceptible to frost action by adding trace chemicals which disperse, aggregate, or waterproof the soil grains. (See also SIP U2113)

SIP U6032

Linell, Kenneth A.
FROST DESIGN CRITERIA FOR PAVEMENTS. Highway Res. Board, Bull. No. 71:18-32 incl. graphs, map, 1953. 5 refs.
DLC, TE7.N28, Bull. 71

Design criteria based on extensive field and laboratory studies by the Corps of Engineers are presented. Methods for recognition of conditions of soil, temperature, and moisture which result in detrimental frost action are described. The computation of the freezing index is illustrated (number of degree-days

between the highest and lowest points on the cumulative degree-days-time curve for 1 freezing season). Isograms of the mean freezing index and the approximate southerly limit where frost penetration in pavement and base may be expected on the average of 1 yr. in 10 for the U. S. are mapped. Examples of pavement designs are given to prevent subgrade freezing and to protect against reduction in strength during the spring thaw. Further studies to improve the present design criteria are discussed.

SIP U6033

Crabb, George A., Jr. and James L. Smith
SOIL-TEMPERATURE COMPARISONS UNDER VARYING COVERS. Highway Res. Board, Bull. No. 71:32-49 incl. table, graphs, appendices A-B; Discussion by Carl B. Crawford, p.48-49, 1953. 21 refs.
DLC, TE7.N28, Bull. 71

Soil temperatures under a wooded watershed, a small grain crop and a meadow cover were studied near Lansing (Mich.). The most stable period for soil temperatures occurs from Jan.- early March with temperature stability being greatest under meadow cover and least under a small grain cover. Soil temperature response to air temperature rise was slowest for meadow cover and sharpest for wooded land from late March to early May. The insulating effect of snow on soil temperature is briefly discussed. A soil temperature lag of less than 1 day was noted within a depth of 1 in. under snow-free conditions; a lag of 3 days was noted under a snow cover. Vegetation exerts a direct influence upon soil temperature and an indirect influence on moisture content at different depths, porosity, permeability, color, and organic content, which in turn influence temperature changes.

SIP U6034

Carlson, Harry and Miles S. Kersten
CALCULATION OF DEPTH OF FREEZING AND THAWING UNDER PAVEMENTS. Highway Res. Board, Bull. No. 71:81-95 incl. tables, graphs, diagrs.; Discussion by Harl P. Aldrich, Jr. and Henry M. Paynter, p.95-98, 1953. 5 refs.
DLC, TE7.N28, Bull. 71

Several years' measurements of ground temperatures beneath paved runways at 3 sites in Alaska were utilized to determine depths and rates of penetration of frost and thaw. A theoretical method, based on the Stefan equation, is given for calculating frost and thaw penetration based on soils and air temperature data, predetermined thermal conductivity values, and surface correction factors. Computed results are compared with the thermocouple measurements. The depth of frost and thaw penetration may be computed within an accuracy of 1-3 ft. where actual penetration is 6-15 ft., provided adequate soil and air temperature data are available.

SIP U6035

Johnson, A. W. and C. W. Lovell, Jr.
FROST-ACTION RESEARCH NEEDS. Highway Res. Board, Bull. No. 71:99-124 incl. graphs, diagrs. 1953. 60 refs.
DLC, TE7.N28, Bull. 71

Research requirements relative to problems associated with freezing and thawing in soils are outlined and several research programs are suggested. The need for a better understanding of the fundamentals of frost action is emphasized.

SIP U6036

Jurva, Risto
ON THE VARIATIONS AND CHANGES OF FREEZING IN THE BALTIC DURING THE LAST 120 YEARS. Fennia, 75:17-24 incl. graphs, map, 1952. 1 ref.
DLC, G23.G4, v. 75

The annual maximum extent of the ice cover on the Baltic is used as an indicator to analyze climatic change and determine if this change is a periodic or an extended increase in temperature. The extent of the ice cover, though mainly a function of negative °C temperatures, is also influenced by the time at which the extensive cold period occurs. Cold weather in the second half of the winter produces a wider ice cover than that in the first half. The amount of cold for the 1928-29 season was only 5% larger than for the 1921-22 season while the maximum of ice cover was 50% larger. The probability of the annual maximum extent of the ice cover is mapped. The probability of total covering is above 5%, while a 20% covering can be expected every winter. The extent of the maximum amount of freezing of the Baltic from 1830-1951 is plotted. Three, 5, 11, and 33-yr. summations of periodicity are plotted. The 33-yr. summation shows a definite trend towards a long decrease in the extent of ice formation on the Baltic.

SIP U6037

Tutton, A. E. H.
THE HIGH ALPS. A NATURAL HISTORY OF ICE AND SNOW. London, Kegan Paul, Trench, Trubner & Co. Ltd. 1931. 319p. incl. illus. tables, graphs, maps, diagrs.
DLC, DQ823.T85, 1931

The chemistry and physics of water, ice and snow including the crystal structure of ice and snowflakes are presented. The position and size of the O and H atoms and the distances between them in the crystal edifice are used to explain the unusual behavior of H_2O on change of temperature and state. The nature of glacier ice and the phenomena of glacier movements are reviewed. Expeditions in the Bernese Oberland, the Pennine, Dauphiné and Bernina Alps, the ascent of the Mont Blanc and the scientific observations made on its summit are described. No bibliographic references are included.

SIP U6038

Mònterin, Umberto
THE PERIODICAL VARIATIONS OF ITALIAN GLACIERS, 1932. (Le variazioni periodiche dei Ghiacciai Italiani, 1932; Text in Italian). Boll. Comitato Glaciol. Ital. 13:16-38 incl. illus. tables, graph, 1933. 3 refs.
DGS, 250(550) qC73, v. 13

Data on movement of 189 glaciers are presented. The increase in stationary and advancing glaciers is attributed to persistent low temperatures and other meteorological factors delaying melting of the snow cover rather than to excessive snow-cover thickness. Ablation measurements made at the Lys and Bors glaciers for 3 yr. indicate that the magnitude of the total ablation depends on the length of the ablation period. Ablation intensity depends on temperatures, independent of the duration of the ablation period. Mean daily ablation was 3.98 cm. in 1930, 3.07 cm. in 1931 and 3.61 cm. in 1932, corresponding to mean temperatures of 6.85°C, 3.61°C and 5.79°C respectively. A decrease of surface velocities observed from 1929-1931 is attributed to lower summer temperatures. It is concluded that recession predominates over the Alpine mountain chain in spite of the slight increase in advancing and stationary glaciers.

SIP U6039

Baronio, Giovanni
INVESTIGATIONS ON THE FORNI GLACIER. (Indagini al Ghiacciaio dei Forni; Text in Italian). Boll. Comitato Glaciol. Ital. 13:125-140 incl. illus. tables, graphs, map, 1933. 5 refs.
DGS, 250(550) qC73, v. 13

Temperature, solar radiation, relative humidity and ablation data for 5 stations from 1926-1930 are presented. The mean daily glacier run-off was 249 l./sec./sq.km., with a daily maximum of 400 l./sec./sq.km. and an absolute maximum of 700 l./sec./sq.km. The influence of solar radiation on the glacial contribution to run-off is shown. The relationship between glacial run-off and mean temperature of the basin is mathematically expressed.

SIP U6040

Mònterin, Umberto
THE PERIODICAL VARIATIONS OF ITALIAN GLACIERS, 1933. (Le variazioni periodiche dei Ghiacciai Italiani, 1933; Text in Italian). Boll. Comitato Glaciol. Ital. 14:17-38 incl. illus. tables, graph, 1934.
DGS, 250(550) qC73, v. 14

Scant precipitation during the winter 1932-33 resulted in a snow cover only half the mean thickness of the 6 preceding winters. The early disappearance of the snow cover at high elevations caused a longer and intensified melting period of the glacial reserves. Glaciers in recession increased by 16%, and advancing and stationary glaciers decreased by 7% and 9% respectively. The progressive decrease of the glacial masses since 1930 is confirmed by ablation measurements. Total ablation measured on the lower station of the Lys Glacier (2350 m.) was 661.9 cm. in 1930, 679.6 cm. in 1931, 714.1 cm. in 1932 and 744.5 cm. in 1933. Higher mean temperatures corresponded with higher ablation, except in 1931 when high ablation occurred at a lower mean temperature, due to greater solar ratiation.

SIP U6041

Mònterin, Umberto
THE PERIODICAL VARIATIONS OF ITALIAN GLACIERS, 1934. (Le variazioni periodiche dei Ghiacciai Italiani, 1934; Text in Italian). Boll. Comitato Glaciol. Ital. 15:19-29 incl. illus. tables, graph, 1935.
DGS, 250(550) qC73, v. 14

Data on movement of 252 glaciers are presented. The apparent discrepancy between excessive snow precipitation and the small decrease in the number of receding glaciers is examined and attributed to varying behavior of glacier fronts at high and low elevations. It is shown that glaciers with fronts above 2700 m. receded less and those with lower fronts more, as compared to previous years. The scant melting at high elevations was reflected in decreased run-off during July-Oct. The mean annual run-off of the Lys measured at d'Ejola (1850 m.) was 1.466 cu. m./sec. in 1932-33 and 0.867 cu.m./sec. in 1933-34. The snow-cover thickness at 3000 m. was 4 m. at the end of March 1933 and only 2 m. at the same period in 1934.

SIP U6042

Mònterin, Umberto
THE PERIODICAL VARIATIONS OF ITALIAN GLACIERS. 1928. (Le variazioni periodiche dei Ghiacciai Italiani. 1928; Text in Italian). Boll. Comitato Glaciol. Ital. 9:9-29 incl. tables, graph, 1929.
DGS, 250(550) qC73, v. 9

Data on movement of 220 glaciers are presented. The influence of temperature and precipitation on the intensity of glacier recession is discussed. A review of glacier variations from 1920-1928 is presented. Data indicate parallel variations in glaciers of similar size, exposure and orographic and geographic positions, due to meteorological factors. Temperature is the primary factor in glacier variations; precipitation is a secondary factor dependent on temperature variations. Years with relatively uniform temperature distribution, i.e., with cold summers and warm winters are richer in precipitation and favorable for glacier advancement; years with warm summers and cold winters have less precipitation and are favorable for glacier recession.

SIP U6043

Mònterin, Umberto
THE PERIODICAL VARIATIONS OF ITALIAN GLACIERS, 1929. (Le variazioni periodiche dei Ghiacciai Italiani, 1929; Text in Italian). Boll. Comitato Glaciol. Ital. 10:7-24 incl. tables, 1930. 1 ref.
DGS, 250(550) qC73, v. 10

Data on movement of 253 glaciers are presented. Snow precipitation and mean temperatures are tabulated. The variations of annual meteorological conditions from 1922-1929 and the relationships between temperature and precipitation and the corresponding variations at high elevations are discussed. Annual maximum precipitation values tabulated for 1923-1929 indicate a regular alternation between dry years with cold winters and hot summers, and wet years with cold summers and mild winters.

SIP U6044

Camoletto, Carlo Felice
OBSERVATIONS AND DATA ON GLACIERS OF THE MARITIME ALPS. (Osservazioni e rilievi sui ghiacciai delle Alpi Marittime; Text in Italian). Boll. Comitato Glaciol. Ital. 10:25-44 incl. illus. tables, maps, diagrs. 1930. 2 refs.
DGS, 250(550) qC73, v. 10

Ablation measurements were conducted on the Della Maledia Glacier (2650 m.) using 6 marked hemp poles. Maximum and minimum day and night temperatures, relative humidities and day and night ablation values are presented for Aug. 23-30, 1929. The mean daily ablation was 31 mm., the mean nocturnal ablation 8 mm. The influence of the relative air humidity on evaporation is discussed. Ahlmann's formula for ablation as a function of temperature is reviewed and applied to the Della Maledia Glacier. Six glaciers were receding due to lack of snow accumulation during the winter 1928-29.

SIP U6045

Mònterin, Umberto
RESEARCH ON THE FUNCTIONING OF TOTALIZERS IN HIGH MOUNTAINS. (Ricerche sul funzionamento dei pluvionivometri totalizzatori in alta montagna; Text in Italian). Boll. Comitato Glaciol. Ital. 9:235-251 incl. illus. tables, 1929. 4 refs.
DGS, 250(550) qC73, v. 9

The 7 totalizers used in the Mt. Rosa region are filled annually with a solution of 10 kg. of $CaCl_2$ in 10 l. of H_2O with an addition of 1 l. of vaseline oil to prevent evaporation. Precipitation collected in the totalizers at D'Ejola (1850 m.) was from 6.2-7% in excess of that measured directly by pluviometers. The differences are attributed to evaporation losses from pluviometers and to wind-blown precipitation and condensation in the totalizers. Values measured at Col d'Olen (2901 m.) from 1926-1928 indicate a total excess of 18% from June-Sept. of the totalizer values over the pluviometer and of 19.5% from Dec.-Feb. An excess of only 4% was measured in Oct. which is attributed to reduced evaporation due to lower temperatures and absence of snowstorms. Suggestions for adequate location, installation and operation of totalizers are presented. The discharge opening at the lower part should be abolished and the instrument made reversible for emptying and cleaning.

SIP U6046

Cappello, Carlo Felice
ON THE FORMATION AND THE STRUCTURE OF ICE IN ALPINE STREAMS. (Sulla formazione e sulla struttura dei ghiacci nei torrenti alpini; Text in Italian with French summary). Boll. Comitato Glaciol. Ital. 18:69-103 incl. illus. tables, diagr. 1938. [25] refs.
DGS, 250(550) qC73, v. 18

The formation and structure of fast and floating anchor and surface ice are discussed in relation to the thermal conditions of soil, water, air, wind and snow cover. Four phases are distinguished during ice formation according to the prevalence of shore ice, icing of jutting rocks, anchor ice and all types combined. The phenomena of ice jams and break-up and the subsequent morphological variations of the hydrographic basins including the significance of water levels are discussed. Observational data of an icing period during the winter of 1934-35 on the Dora Riparia River at Oulx are presented. (Author's summary).

SIP U6047

Somigliana, C.
ON THE MECHANICAL THEORY OF GLACIER MOVEMENT. (Sulla teoria meccanica del movimento glaciale; Text in Italian). Boll. Comitato Glaciol. Ital. 16:43-56 incl. diagrs. 1936. 8 refs.
DGS, 250(550) qC73, v. 16

Glacier ice flow is considered as the movement of a viscous fluid within an inclined open channel. The single ice particles flow in lines parallel to the channel walls. It is assumed that the mass consists of thin horizontal sections which move over each other without deforming. The velocity in general decreases from the outer to the inner layers. The problem is treated mathematically by applying the equation for the movement of viscous fluids with internal friction. It is concluded that the internal coefficient of friction of glacier ice is still undefined, and it is believed that this coefficient is a function of several factors including pressure and temperature.

SIP U6048

Alfieri, Secondo
FIVE YEARS OF HYDROLOGICAL OBSERVATIONS ON THE LYS AND RUTOR STREAMS. (Un quinquennio di osservazioni idrologiche sui torrenti Lys e Rutor; Text in Italian). Boll. Comitato Glaciol. Ital. 16:143-151 incl. tables, graphs, 1936. 7 refs.
DGS, 250(550) qC73, v. 16

Mean monthly and annual run-off, annual precipitation

and run-off coefficient values for 1931-1935 are tabulated. The mean monthly run-off and the relative run-off coefficients vary little for Nov.-March, but considerably for the other months. Run-off is greatest in July and smallest in March. The run-off of both streams exceeds precipitation by 199 mill. cu. m. due to glacier recession and evaporation not accounted for by totalizer measurements. Ablation values for Aug. 1-9 and Aug. 24-Sept. 7, 1933 and the relative temperatures are graphed, indicating considerable differences in the run-off and temperature inter-dependencies during different groups of days. The mean glacier summer run-off of the Lys stream at D'Ejola was 292.8 l./sq. km./sec., with a mean daily maximum of 463.8 l./sq. km./sec.; the mean contribution of the Rutor stream at Promise during this period was 399.1 l./sq. km./sec. with a mean daily maximum of 602 l./sq. km./sec. The run-off of the Lys increased by 24 l./sq. km./sec. and of the Rutor by 38 l./sq. km./sec. for each °F temperature increase. The mean annual run-off for the Rutor was 115.8 l./sq. km./sec., and that of the Lys 78.5 l./sq. km./sec.

SIP U6049

Lepape, Adolphe and Georges Colange
ON SUMMER ICE FORMATION IN THE AUVERGNE LAVA FLOW. (Sur la formation de la glace, en été, dans les coulées volcaniques d'Auvergne; Text in French). Compt. Rend. 213:292-294, Aug. 25, 1941. 4 refs.
DLC, Q46.A14, v. 213

Funnel-shaped ice holes 5-10 m. deep, were observed in a lava flow, 6-7 km. southeast of Pontgibaud (France) at 700-800 m. elevation. Ice forms in a secondary cavity 0.5-1 m. wide and open to the north. Ph. Glangeaud attributed the ice formation to rapid evaporation of capillary water rising through the lava. A lack of air movement and sunlight, continuously saturated air and low temperature at the bottom of the funnels preclude any such evaporation. The ice, which forms throughout the summer, is probably due to nocturnal cooling.

SIP U6050

Lipscomb, Raymond N.
TECHNOLOGICAL ASPECTS OF ARCTIC WARFARE. 35p. [1947]. [25] refs. (typed ms.)
AMAU, 355.8 L787t

The semantics of technological and arctic are elaborated. Arctic and subarctic climates are discussed and defined. Clothing must be designed to provide a maximum insulation against the cold. Food rations must be larger than in temperate climates and an abundance of hot food and liquid is needed. The equipment used for the movement of troops and the special care required to prevent its malfunctioning caused by condensation and formation of rust, corrosion and ice are discussed.

SIP U6051

Humbel, F., F. Jona and P. Scherrer
ANISOTROPY OF THE DIELECTRIC CONSTANT OF ICE. (Anisotropie der Dielektrizitätskonstante des Eises; Text in German with English summary). Helv. Phys. Acta, 26:17-32 incl. graphs, diagr. Feb. 15, 1953. 18 refs.
DLC, QC1.H4, v. 26

Square plates of ice, 0.3-0.5 cm. thick, were cut with the major surfaces either parallel or perpendicular to the optical axis from large single crystals of ice. The dielectric constants and the loss angles were measured as a function of the temperature and frequency. The dielectric constant measured in the direction of the c-axis was slightly larger than that measured perpendicular to the c-axis. The relative difference at 1 kc./sec. is about 15% at -5°C, about 12% at -20°C, and about 8% at -40°C. The dependency of the dielectric constants and of the loss angles on frequency is similar to that found in earlier observations on polycrystalline ice. (Authors' abstract)

SIP U6052

Ahnfelt, S.
NEW TENDENCIES IN WINTER WARFARE. (Nya tendenser i vinterkrigföringen; Text in Swedish). Ny Militär Tid. 26:59-63, 1953.
DLC, Unbound periodical

Well-trained Finnish ski troops used horses and moved at 2-4 km./hr. in rough terrain during severe weather (1939-1941). Arctic warfare tactics involve air-borne and motorized ski troops. It is estimated that a battalion engaged in battle at about 15 km. from highways required 30 tons of supplies daily. These supplies can be brought by 19 Weasels or 4 caterpillar cars (Mark II) which can also be used to tow fresh ski troops to the front and remove the wounded in 2 daily trips. The success of winter warfare depends on the training and equipment of ski soldiers.

SIP U6053

Prahm, Gertrud
THE MELTING TIME OF THE ICE ON THE GERMAN COASTS BETWEEN EMS AND ODER. (Die Abschmelzzeit des Eises an den deutschen Küsten zwischen Ems und Oder; Text in German with English summary). Deut. Hydrographische Z. 4:17-28 incl. tables, 1951. 12 refs.
DLC, VK588.D4, v. 4

The melting time of the ice is defined as the number of successive days with mean air temperature above 0°C after thaw has set in until the last ice has disappeared. Calculations are made for a number of areas for normal and icy winters. Mean values of melting time for normal winters are 2.7, 3.5, and 3.6 days for the North Sea, Baltic Sea, and North Baltic Sea Canal, respectively and for icy winters 6.1, 9.9, and 10.5 days, respectively. The duration differences are attributed to climatic differences. Local differences are chiefly due to morphological and hydrographical conditions.

SIP U6054

Letzmann, J.
THE DEPTH OF THE SNOW COVER IN THE EAST BALTIC AREA. (Die Höhe der Schneedecke im Ost-Baltischen Gebiet; Text in German). Dorpat, C. Mattiesen, 1921, 65p. incl. tables, graphs, maps.
DLC, QC929.S7I4, 1921

Snow cover distribution and depth data from 60 stations for the period 1891-1910 are analyzed. Mean and maximum snow depths, and beginning dates of snow cover are tabulated. The annual trend of the snow depth is analyzed. Mean temperatures for 9 stations are tabulated to indicate relationships between snow amounts during winter and the mean April temperature. The mean density and water content of the snow cover at 1 station are tabulated.

SIP U6055

Reinhard, H.
SNOW COVER CONDITIONS IN MECKLENBURG. (Zur Kenntnis der Schneedeckenverhältnisse in Mecklenburg; Text in German). Angew. Meteorologie, 1: 114-119 incl. graphs, maps, Jan. 1952. 5 refs.
DLC, GPRR

Data of mean duration of snow cover (1891-1950) and mean number of days with snow, and histograms of mean depth of snow cover at Greifswald (1901-1948) are shown and discussed. Maximum snow cover depth (about 16 cm.) is attained during the second and third Feb. decade.

SIP U6056

Grunow, Johannes
CRITICAL ICE FOG STUDIES. (Kritische Nebelfrost-studien; Text in German with English summary). Arch. Meteorologie, Geophysik, Bioklimatologie, Ser. B, 4: 389-419 incl. illus. tables, graphs, diagrs. 1953. 28 refs.
DLC, QC851.A732, v. 4

All known methods of measuring ice fog deposits are compared and analyzed. A collector in the form of a net, which is independent of wind direction, is proposed as a supplement to the ordinary rain gage. The various ice fog deposits are defined, compared, and classified according to H. Köhler's classification. This scheme includes air hoar (Rauhreif), an intermediate deposit (Raufrost) formed by freezing of water droplets accompanied by sublimation, and rime (Rauheis). The frequency of ice fog deposits and accompanying meteorological conditions are discussed for the Hohenpeissenberg. Observational data from 1901-1950 are used.

SIP U6057

[Bethlahmy, Nedavia]
DISCUSSION OF "FROST PENETRATION INTO SOILS AS INFLUENCED BY DEPTH OF SNOW, VEGETATIVE COVER, AND AIR TEMPERATURES" ...Trans. Am. Geophysl. Union, 34:635-637 incl. tables, Aug. 1953. 2 refs.
DLC, QE500.A6, v. 34

Laboratory experiments were conducted to determine whether soil blocks could indicate the presence of permeable or impermeable types of frost. The soil-moisture resistances as related to frost type and moisture content are tabulated for 5 samples. The data show that soil blocks do not indicate the type of frost present. Permeable frost changing into impermeable frost as water is drawn from lower unfrozen layers will not necessarily change the resistance measurement. Resistance of fiberglas blocks in loamy soil at depths of 1-18 in. during 5 successive days of freezing are tabulated. (See also SIP U3002)

SIP U6058

[Arctic Indoctrination School]
FACTORS INFLUENCING COLD WEATHER OPERATIONS. 5p. [n.d.] (typed ms.)
AMAU, M-34373-NC, Pt. 3

Basic tactical operations are the same in the arctic as elsewhere. Variations in the mechanics of application are presented. Forays should be made by small tactical units, never exceeding battalion and preferably of company size, capable of independent action for a short period of time. The supply personnel should be 20% larger than in moderate climates because ration requirements alone are 50% greater. Cross-country movement in deep snow should be limited to short distances. A maximum speed of 1 mi./hr. can be maintained for only a few hours. Camouflage is important but should not be maintained at the expense of mobility. Troops must be proficient in the use of skis and snowshoes. A minimum of 10 yd. should be maintained between individuals to reduce the effects of overflow. Clothing must be worn to avoid both chill and overheating.

SIP U6059

R., E.
ROAD MAINTENANCE AND DURATION OF THE SNOW COVER. (Vegvedlikeholdet og Snödekkets varighet; Text in Norwegian). Medd. Vegdirektøren, No. 3:32-33 incl. maps, 1944.
DPR, Unclassed periodical

Winter road maintenance in southern Norway can be facilitated with the aid of maps indicating mean duration of the snow cover from 1896-1915 and population density per sq. km. The snow cover map denotes areas having a snow-cover duration of 20, 10-20, and less than 10 weeks.

SIP U6060

Skaven Haug, Sv.
QUANTITATIVE FROST MAPS FOR NORWAY. (Frostmengdekart over Norge; Text in Norwegian). Medd. Vegdirektøren, No. 5:49-54 incl. table, graphs, maps, May 1944.
DPR, Unclassed periodical

The frost factor determining the depth of frost penetration into the ground is expressed numerically as the product of duration and minus degrees temperature. The quantitative frost maps for Norway

(1:130,000) are based on temperature observations from 1861-1920 at 300 stations. The plotted maximum and mean curves are considered basic for practical and theoretical treatment of ground frost problems even though the curves coincide closely with topographical features. These data are used by the Norwegian State Railroad to forecast frost heaving.

SIP U6061

Abrahamsen, Egil
REPORT ON THE ØVERÅSEN SNOW CUTTER, WINTER OF 1943/44. (Rapport om Øverâsen Snøfreser vinteren 1943/44; Text in Norwegian). Medd. Vegdirektøren, No. 9:97-98 incl. illus. graphs, Sept. 1944.
DPR, Unclassed periodical

The plow kept a 36-km. road open during the 4 winter months when the total precipitation was 367 mm. and the maximum snow depth (March) was 185 cm. A cutter with 5 blades is considered adequate for loose snow; a 5-blade cutter combined with a front plow gave satisfactory all-round results.

SIP U6062

Brudal, Holger
FROST-FREE HIGHWAYS. (Telefrie veger; Text in Norwegian). Medd. Vegdirektøren, No. 7:73-81 incl. table, graphs, July 1945.
DPR, Unclassed periodical

The technical and economical aspects of frost-free road construction are discussed on the basis of empirical and theoretical considerations. Graphs indicate the thickness of sand and/or gravel to be used on top of peat for asphalt or concrete surfaces. The capillary effect of ground water controls the depth of frost penetration, and is demonstrated by curves. The insulating effects of a snow cover against frost penetration into clay at various quantitative frost units are discussed and graphically presented.

SIP U6063

Hofseth
AN EXPERIMENTAL JOURNEY TO INNER FINNMARK WITH A CATERPILLAR TRACTOR. (Forsökstur med beltetraktor i indre Finnmark; Text in Norwegian). Medd. Vegdirektøren, No. 10:116-119 incl. illus. Oct. 1945.
DPR, Unclassed periodical

Winter traffic with a tractor was tested on a 102-km. stretch along the Norwegian-Finnish border. Wind-pressed snow supports a tractor; medium hard snow with underlying loose snow will collapse under the vehicle; loose snow has no bearing capacity and the vehicle will flounder when such snow is over 1 m. deep. A tractor road in this region is being considered.

SIP U6064

Liverovskiĭ, IU. A.
SOILS OF THE NORTHERN REGION TUNDRAS. (Pochvy tundr severnogo kraîâ; Text in Russian with English summary). Trudy Poliârnoĭ Komissii Akademiîâ Nauk SSSR, 19:1-112 incl. illus. tables, diagrs. 1934. 148 refs.
DLC, G600.A4, v. 19

Microrelief of Eurasian arctic and subarctic tundra, its forms and genesis were studied. Typical surface forms consist of large spots devoid of vegetation and an elevated stony framework. Homogeneous soil surfaces are fissured into convex polygons with scant arctic vegetation at the edges. Theories of spot formations are reviewed. Polygonal spots result from repeated freezing and thawing in the presence of permafrost. The semi-liquid layer is extruded by 2 frozen layers and expands upon freezing, resulting in an uneven surface or spots. Three groups of spots are described and illustrated.

SIP U6065

Smyth, Charles P.
THE DIELECTRIC CONSTANTS OF SOLIDS AND MOLECULAR ROTATION. Chem. Revs. 19:329-361 incl. tables, graphs, Dec. 1936. 93 refs.
DLC, QD1.A5635, v. 19

Information regarding rotation or non-rotation of a number of solids and their lattice form is tabulated. Ice is included in the discussion of experimental material. Ice gives no direct evidence of molecular rotation, and dielectric constant measurements show the possibility of rotation with a difficulty which increases rapidly but continuously with falling temperature. High dielectric constant values found by Murphy may be due to better filling of his condenser with the solid or to ionic impurities. The supposition that it is a question of molecular orientation or rotation in ice is supported by observations of the dependence of the dielectric constant upon frequency and temperature in 4 salts with water of hydration. The great effect of ionic impurities on the dielectric constant of ice is shown by a graph.

SIP U6066

Arctic Indoctrination School
SNOW AND AVALANCHES. 4p. [n.d.] (typed ms.)
AMAU, M-34373-NC, Pt. 11

Powdered snow is classified into new snow, settling snow, and settled snow. A wind slab is a snow deposit packed by a wind agency, lacks anchorage to the surface below, and avalanches upon fracture. A wind crust is a hard deposit which breaks locally upon fracture. Six points of avalanche consideration are listed. All slopes steeper than 22° are suspect. Open and smooth mountain terrain is conducive to avalanche. Snow will slide more easily on grassy or slick rock slopes. Deep snow slides more readily than shallow snow. Powder snow on a crust forms an unstable anchorage; wet snow on a crust constitutes a stable situation.

SIP U6067

Arctic Indoctrination School
DEMONSTRATION OF SPECIAL EQUIPMENT. 3p. [n. d.] (typed ms.)
AMAU, M-34373-NC, Pt. 6

The following pieces of equipment are described and their care and maintenance outlined: skis, snowshoes, sled-toboggan, Yukon stove, 1-burner gas stove, mountain cookset, emergency thong, rucksack, packboard, ski wax, candles, machete, axe, entrenching tool, mountain knife, mountain brush, waterproof match-box, heat tablet, chemical fire starter, chapstick, compass lensatic, sunglasses, mountain ski boots, 5-man lightweight pyramidal tent.

SIP U6068

Jost, W.
GLACIER FLOW, ICE AND WATER. (Gletscherströme, Eis und Wasser; Text in German). Schweizer J. 19:10-14 incl. illus. Aug. 1953.
DLC, AP32.S46, v. 19

A general discussion of glacier formation, movement, and economy is presented. Included are the theories of pressure melting, metamorphism, and the streamline theory of glacier movement.

SIP U6069

Kjos, Arne
THE DEGREE OF MOISTURE IN REPLACEMENT MATERIALS. (Fuktighetsgraden i masseinnskiftingsmaterialer; Text in Norwegian). Medd. Vegdirektøren, No. 7:84-87 incl. illus. graphs, July 1945.
DPR, Unclassed periodical

Capillary heights and distribution of water in gravel on top of peat were laboratory tested to find the best combination in replacement materials for frost-free highway construction. Beskow's curves were used for the 3 gravel types tested, capillary heights of which were measured by means of his apparatus. The results indicate that peat (70-80% water content) does not affect water distribution in gravel. Capillarity depends on the level of ground water and the consistency of the gravel. Capillarity in gravel fill is not detrimental if it extends only slightly above the ground-water level.

SIP U6070

"Vägen"
CARBIDE FOR THAWING FROZEN GROUND. (Karbid til teletining; Text in Norwegian). Medd. Vegdirektøren, No. 5:61, May 1941.
DPR, Unclassed periodical

The snow is removed, Na_2C_2 deposited and covered by snow or sprinkled with water and then ignited. The C_2M_2 gas developes intense heat, surpassing petroleum used in the past.

SIP U6071

K., O.
SELF-CLEANING SNOW CHAINS. (Selvrensende snøkjeder; Text in Norwegian). Medd. Vegdirektøren, No. 3:33 incl. illus. March 1943.
DPR, Unclassed periodical

The chain was invented in the USSR during the war and is described as a dirt chain. It consists of alternating short and long links. The longer links are equipped with 2 small rings at right angles. This arrangement prevents torsion and increases the pull of a vehicle on a snow field or loose slippery soils.

SIP U6072

Rønning, Rolf
SNOW REMOVAL AND WINTER MAINTENANCE ON NORWEGIAN HIGH MOUNTAIN ROADS. (Snøbrøyting og vintervedlikehold på norske høgfjellsveger; Text in Norwegian). Medd. Vegdirektøren, No. 5:53-54 incl. diagrs. May 1943.
DPR, Unclassed periodical

Methods and means to utilize the wind for snow removal are discussed. Expensive man-power can be reduced by supplying more snow fences at critical points and snow removal equipment of adequate power, speed and design. Two types of snow cutters are discussed briefly.

SIP U6073

Fleischer, H.
PEAT AGAINST GROUND FROST. (Torv mot tele; Text in Norwegian). Medd. Vegdirektøren, No. 9: 100-101, Sept. 1943.
DPR, Unclassed periodical

The ground-frost problems of the Norwegian State Railroads are discussed. Experimentation with peat demonstrated favorable insulating properties. A rough estimate indicates that replacement materials are needed for about 300 km. of rail lengths to counteract the ground frost.

SIP U6074

Gjørv, O. A.
THE PROBLEM OF FROST HEAVING. (Litt om tele; Text in Norwegian). Medd. Vegdirektøren, No. 9: 93-100 incl. graphs, diagrs. discussion, Sept. 1943.
DPR, Unclassed periodical

The method presented for calculating magnitude of frost heaving in road and railroad construction when certain material constants are known is based on the findings of Beskow, Watzinger, Kindem and Michelsen. G. Beskow formulated the principles of determining the ground-water conditions and certain constants of the soil in such a way that the capillarity, and thereby the frost heaving, can be calculated. A. Nielsen believes the method is practical for protection against ground-water frosts. The Road Director's Office refers to cases in which ground water was not the cause of heaving.

SIP U6075

Haase, Hugo
THE ORGANIZATION OF THE METEOROLOGICAL AND HYDROMETRICAL SERVICE IN WEST HARZ. (Die Organisation des meteorologischen und hydrometrischen Dienst im Westharz; Text in German). Wasserwirtschaft, 39:237-244 incl. illus. map, Aug. 1949. 17 refs.
DLC, TC1.W275, v. 39

The Service maintains precipitation gages, snow depth gages, apparatus for measuring evaporation from snow and water, and a communication system for weather reports. The measures taken for flood control, calculation of surface and subterranean runoff, and erosion control are briefly outlined.

SIP U6076

Schulz, Leo
THE SNOW COVER IN THE OBERHARZ. (Über die Schneedecke im Oberharz; Text in German). Ann. Meteorologie, 5:190-191 incl. table, graphs, 1952. (Short reports)
DLC, QC851.A65, v. 5

Five-day means of snow cover, the probability of the occurrence of specific snow depths, and the dates of mean beginning, end, and extreme dates of the snow cover were calculated from a series of observations at Clausthal (1887-1940). The probability of snow depths greater than 10 cm. before Christmas is greater than during the Christmas season.

SIP U6077

Schweitzer, H.
THE DETERMINATION OF THE MICROSTRUCTURE OF CLOUDS AND PRECIPITATION AREAS BY MEANS OF CENTIMETER-RADAR WAVES. (Bestimmung der Feinstruktur von Wolken und Niederschlagsgebieten durch Zentimeter-Radarwellen; Text in German). Umschau, 53:328-329 incl. diagr. June 1953. 2 refs.
DLC, AP30.U5, v. 53

Strong bright band radar echoes were observed with precipitation accompanying warm fronts with cloud layers 10-100 m. thick. The clouds producing these bright bands are usually located just under the 0°C isotherm, and only occasionally occur at temperatures between -12° and -17°C. These facts indicate that the modifications of the reflections are related to a change in the condition of the precipitation particles due to partial melting. The theory is that spheroid water particles have higher reflective properties than ice particles of the same volume. (See also SIP U5776)

SIP U6078

Hess, Hans
NEW SNOW INVESTIGATIONS. (Über neue Schneeforschungen; Text in German). Z. Deut. Alpenver. 71:196-206 incl. illus. tables, graph, diagrs. 1940. 5 refs.
DLC, DQ821.G3, v. 71

Laboratory and field investigations conducted at Weissfluhjoch from 1936-1938 are reviewed. The crystal structure, and numerous physical constants of snow were determined in the laboratory. A series of photomicrographs of snow crystals showing changes in size with time was taken over a 90-day period. Field investigations included measurements of meltwater percolating through the snow cover, depth of the snow cover, and density determinations of various layers at different time intervals. Ten classes of snow are listed together with the density range of each class. Snow creep and its relation to avalanche release were also investigated.

SIP U6079

Olsson, Axel
INVESTIGATIONS OF THE INFLUENCE OF ROLLING ON SOIL TEMPERATURE AND AIR TEMPERATURE NEAR THE SURFACE. (Undersökning över vältningens inverkan på marktemperaturen och lufttemperaturen närmest markytan; Text in Swedish with English summary). Kungl. Lantbruksakademiens Tid. 92:220-241 incl. tables, graphs, 1953. 21 refs.
DLC, Unbound periodical

Peat and humus soils were rolled with a 250-kg. Cambridge roller and a 1000-kg. concrete roller to determine whether compaction increased heat conductivity. Meteorological observations included cloudiness, wind velocity and precipitation. Soil temperature at a depth of 10 cm. and air temperatures at 0.05 and 1.5 m. above the ground were measured several times daily. The tabulated results of experiments in 1930, 1940, 1942 and 1943 verify the theory of increased conductivity. A minimum temperature of -12°C at 5 cm. above unrolled ground and -10°C above rolled test strips was recorded during an extremely cold period in 1951. Two rollings increased the effect by about 0.5°C immediately above the ground. The temperature difference above rolled and unrolled soil was greater on calm, sunny days. The results indicate that rolling protects tender seedlings from frost damages.

SIP U6080

Arctic Indoctrination School
TYPES OF INDIVIDUAL OVERSNOW MOVEMENT. 3p. [n.d.] (typed ms.)
AMAU, M-34373-NC, Pt. 13

Methods of oversnow movement with skis and snowshoes are described. Snowshoes are easier to use by untrained troops than skis and are usually better than skis in terrain providing maximum cover and concealment. Men on snowshoes can carry heavier packs and pull loads more easily than men on skis. Snowshoes should always be worn in snow 12 in. deep or more, and never in snow less than 3 in. deep. Minimum standards of proficiency, (carrying 50 lb. on a packboard 12-15 mi./day) can be attained after 2 weeks training. Cross-country skis with balato type binding and mountain skis with steel cable type binding are described. A skier should be able to go 20 mi./day with a 35-lb. rucksack after 1 month training. The different kind of waxes used are discussed and waxing hints are given.

SIP U6081

Turnbull, David and Bernard Vonnegut
NUCLEATION CATALYSIS. Ind. Eng. Chem. 44: 1292-1298 incl. tables, graphs, June 9, 1952. 25 refs.
DLC, TP1.I6, v. 44

The structural relations between the forming crystal and the nucleation catalyst are discussed. AgI is the most potent catalyst known for the formation of ice crystals, its effectiveness being due to the close fit between the lattice structure of AgI and that of ice. A potent nucleation catalyst has a low index plane in which the atomic arrangement is similar to that in certain low index planes of the forming crystal. The order of potency of catalysts is identical with the reciprocal of their disregistry with low index planes of the forming crystals. Nuclei will form coherently with the catalyst when the disregistry is small, and the free energy of transition is proportional to the square of the disregistry.

SIP U6082

Shlezinger, M.
OZONE IN POLAR AIR. (Ozon v polîarnom vozdukhe; Text in Russian). Meteorologiîa i Gidrologiîa, 3, No. 6:92, 1937.
DLC, QC851.M27, v. 3

The ozone content of air is greater in polar than in equational regions, attaining a maximum during the arctic night. A higher ozone content was found in the snow near the surface and in the air immediately over the snow. Further investigation on the relationship of higher ozone content in polar air and in the snow surface is suggested.

SIP U6083

Wilkinson, C. S., Jr.
STUDY OF THE FACTORS AFFECTING THE FRICTION OF TREAD COMPOUNDS ON ICE. India Rubber World, 128:475-481 incl. illus. tables, graphs, diagrs. July 1953. 14 refs.
DLC, TS1890.I53, v. 128

Friction experiments were conducted in a sub-zero cabinet at varied controlled temperatures. Ice is frozen in an Al tray, 1 ft. in diam., revolving under the stationary samples tested. The procedure used in preparing the ice to assure a uniform crystal structure, a transparent and crack-free ice with a flat and level surface, is described. The influence of the shape of the sample tested was analyzed. A disk molded into the shape of half of an oblate spheroid with a maximum thickness of 0.1 in. cemented to the end of a metal cylinder 0.5 in. in diam. proved most satisfactory. Frictional changes with pressure, velocity, temperature, type of polymer and hardness of sample were studied. Friction increases when the velocity is increased from 0-2 cm./sec., then decreases with increasing velocity. Friction increases when the temperature is decreased from 0° to -30°C, then decreases with decreasing temperature. Friction decreases with the log of the pressure. The softest samples have the highest coefficient of friction. Friction of rubber against ice is principally due to welding and breaking of junctions in the ice and to a slight extent to the viscosity of the water film between the sliding surfaces.

SIP U6084

Arctic Indoctrination School
PRINCIPLES OF OVERSNOW MOVEMENT AND FREIGHTING. 2p. [n.d.] (typed ms.)
AMAU, M-34373-NC, Pt. 10

March tables must be adjusted and time and space factors carefully considered to cope with the extreme conditions encountered in the arctic. The rate of march must be that of the slowest man. The column must be frequently checked for fatigue and overheating. Hands and feet must be well-protected, the body should be cool or cold before the march starts. A 2-3 min. halt after the first 15-20 min. is made to adjust clothing and packs. The length of march should then be gradually lengthened to reach 2-3 hr. between breaks after several months of training. The trail breaker should not be allowed to get tired and may be able to lead for only 50-75 yd. Energy food such as candy bars and safety items such as sox, insoles, mittens, matches, heat tabs should be carried. Four basic methods of resupply are listed in order of efficiency: air drop or lift, over-snow vehicle, backpacking, and sledging. The use of animals is not recommended.

SIP U6085

Allan, S. J.
RADIOACTIVITY OF FRESHLY FALLEN SNOW. Monthly Weather Rev. (U.S.), 30:576-577 incl. graph, Dec. 1902.
DLC, QC983.A2, v. 30

Snow gathered from a thin layer on the surface during a snowstorm was evaporated to dryness in a shallow tin vessel. The vessel which contained no trace of radioactivity was now radioactive. Similar tests were made over a 6-month period. Tests made on the rate of decay showed that this radioactivity followed a geometric progression reaching 0.5 value in about 30 min. Tests made on the penetrating power gave results similar to those excited from air. The amount of radioactivity during a snowstorm is constant as long as the fall remains the same. Only a trace remains 24 hr. after the snowfall stops. One square mile of snow cover, 1 cm. thick, could provide radioactivity equivalent to an ionisation current of 1.5×10^{-4} amp./sec. A radioactive substance is probably present in the atmosphere and the falling snow acting as a filter tends to remove portions of it.

SIP U6086

Kimball, H. H.
ICE CAVES AND FROZEN WELLS AS METEOROLOGICAL PHENOMENA. Monthly Weather Rev. (U.S.), 29:366-371 incl. table, Aug. 1901. 10 refs.
DLC, QC983.A2, v. 29

Several ice caves and frozen wells in Europe, W. Va., N. Y., Conn., Vt., Iowa, Colo., and Wash. are described. Cold winter air circulates to unusual depths below the surface and freezes the small quantities of water with which it comes in contact. This subterranean circulation ceases in summer, heat finding its way down only through conduction. The accumulated winter ice does not completely melt before a new accumulation of ice begins, permitting a continuous increase of the ice deposits.

SIP U6087

Woodcock, Alfred H. and Gordon A. Riley
PATTERNS IN POND ICE. J. Meteorology, 4:100-101 incl. illus. diagr. June 1947. (Shorter contributions) 9 refs.
DLC, QC851.A283, v. 4

Cell-like ice formations, interspersed with dark, elongated areas of water, were observed at L. I., Conn. and R. I. on Feb. 28 and March 1, 1946. The patterns formed were somewhat like experimentally produced polygonal convective patterns. These experimental cells, about 3 times the depth of the fluid layer in width, were developed by heating the fluids from below. The ice-pond cells were spaced at distances of 10-30 times the depth of the water. It is concluded that if these ice patterns result from convective cells in the underlying water, a different geometrical relationship exists.

SIP U6088

Kol, Erzsébet
THE GREEN SNOW OF YELLOWSTONE NATIONAL PARK. Am. J. Botany, 28:185-191 incl. illus. table, graph, March 1941. 11 refs.
DLC, QK1.B345, v. 28

Green snow in N. Amer. is reported for the first time. It is caused by the presence of large quantities of Chlamydomonas yellowstonensis Kol and smaller quantities of 10 other algae. Green snow in other parts of the world (Switzerland, Spitsbergen, Greenland, Hungary, and Antarctica) is caused by different Raphidonema species. Green snow has a pH value varying from 6-6.5 and is characteristic of calcitrophic snow fields.

SIP U6089

Sutherland, G.B.B.M.
EXPERIMENTS ON THE RAMAN EFFECT AT VERY LOW TEMPERATURES. Proc. Roy. Soc. London, Ser. A, 141:535-549 incl. tables, diagr. Sept. 1933. [34] refs.
DLC, Q41.L7, v. 141A

A simple apparatus is described for the rapid examination of Raman spectra at very low temperatures. The Raman spectrum of ice was photographed at the temperature of liquid air and found to differ markedly from that obtained at 0°C. The increased sharpness of the ice lines with lowered temperature is assumed to be dependent on strong intermolecular fields. Diffuseness between the gas, liquid and solid phases is also attributed to strong intermolecular fields. Evidence tends to indicate that $(H_2O)_2$ molecules are the highest aggregates in water and ice. Raman spectra of solid N_2O_4, liquid ozone, solid CH_4, solid NH_3, and CCl_4 at liquid air temperatures were obtained.

SIP U6090

Cunningham, Robert M.
A DIFFERENT EXPLANATION OF THE 'BRIGHT LINE'. J. Meteorology, 4:163, Oct. 1947; Reply by Horace R. Byers. (Correspondence)
DLC, QC851.A283, v. 4

Data are presented indicating that the radar bright line echo originates below the 0°C level or the area of melting snow. The region above the bright line gives less return than the region below. Aircraft observations indicate that the bright line is a region of transition between snow and rain, fine snow being observed above the bright line, and light rain below it. Radar photographs by H. R. Byers show no return from above the bright line, indicating that no snow was falling into the bright line area. The phenomenon could be explained more adequately by growth of new condensation products rather than by melting.

SIP U6091

K., H. H.
COLORED SNOW. Monthly Weather Review, (U.S.), 29:465-466, Oct. 1901. (Notes by the Editor)
DLC, QC983.A2, v. 29

Incidence of colored snow is reported and its causes are analyzed. Red snow found mainly in arctic regions developes after the snow has fallen and is caused by minute organisms, Protococcus nivalis, and several species of infusoria. Yellow snow in Pa. was due to the presence of pine pollen abundant further south in the state when the snow fell. Black and brown snow in N. Y. was due to finely divided earth and vegetal matter blown along gales accompanying the storm. One instance of black snow due to iron dust originating outside the atmosphere is reported.

SIP U6092

Stefanizzi, A.
ON THE RADIOACTIVITY OF ATMOSPHERIC PRECIPITATES. J. Geophysl. Res. 55:373-378 incl. tables, graphs, Dec. 1950. 9 refs.
DWB, 551.05 j86, v. 55

The radioactivity of atmospheric snow and rain was measured on 33 occasions to determine where the precipitates acquire their induced radioactivity. The radioactive products of precipitates were obtained by collecting 25 cc. of precipitate in 3-5 min. through a large funnel and evaporating it in a small tray. The activated tray is then introduced into a plate condenser for measurements. Snow usually has a greater activity than rain; rain in thunder showers is more active than ordinary rain. The size of raindrops in-

fluences the activation of precipitates, small-size drops being accompanied by low activity. Decay products of thoron were detected in the precipitates. A certain amount of activity is acquired during their fall from the clouds to the ground level.

SIP U6093

Etienne, Erich
THE RADIATION MEASUREMENTS. (Die Strahlungsmessungen; Text in German). p.65-111 incl. illus. tables, graphs, diagrs. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

A Michelson-actinometer was used to measure intensities of total radiation. Direct solar radiation values at various elevations are plotted, and turbidity factors are calculated. Total radiation on a horizontal area was measured by a Robitzsch-actinograph. The relationship of radiation on cloudy and bright days is analyzed. The radiation balance of the snow-covered glacier surface was measured by means of an Albrecht radiation balance meter. Theoretical considerations concerning the radiation properties of a snow cover are discussed. The influence of cloudiness on the radiation balance, and the diurnal course of radiation balance on bright and on cloudy days are analyzed. The effective outgoing radiation of a snow surface is calculated as a function of total radiation and albedo, and the snow-surface temperatures for 24 hr. are plotted. A comparison of snow-surface radiation balance values with values obtained by other investigators shows that the balance varies only within very narrow limits. This stability is attributed to the influence of the reflectivity of the snow surface and of counterradiation on the radiation balance.

SIP U6094

Etienne, Erich
SURVEY OF OPERATIONS AT THE FIRN STATION. (Überblick über die Arbeiten an der Firnstation; Text in German). p.112-117 incl. diagr. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

The firn station was dug into the Igdlo Glacier, and consisted of an entrance shaft, 2-3 m. deep, which led to the instrument room, which in turn was connected by a 3-m. long tunnel to the living quarters. A tent was erected within the quarters, and one above the air shaft to the quarters to prevent snowdrifts. Firn density measurements, photomicrographs, and thermal conductivity determinations were made in the instrument room. Various firn profiles were dug to depths of 5.3 m., and a variety of layers were observed. Blue bands or ice layers, up to 10 cm. thick, were characteristic of the microstructure at all depths. The ice crusts varied in thickness and extent in the different shafts.

SIP U6095

Etienne, Erich
DENSITY DETERMINATION OF FIRN AND ICE SAMPLES. (Die Dichtebestimmungen von Firn- und Eisproben; Text in German). p.117-121 incl. table, graph. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

Firn samples were obtained with measuring cylinders of 490 cu. cm. capacity, and weighed on a balance inside the instrument room of the firn station. Ice samples were weighed in air and in alcohol to determine the volume of the ice, and the density was calculated from the weight and volume. The results of density determinations at various depths for firn and ice layers are tabulated. The firn density increases slowly in the upper layers and remains constant at 0.53 to a depth exceeding 5 m. The densities of the ice layers varied little at all depths from a value of 0.869.

SIP U6096

Etienne, Erich
THE MICROSTRUCTURE OF FIRN AND OF ICE LAYERS. (Die Feinstruktur des Firns und der Eisschichten; Text in German). p.121-144 incl. illus. table, diagr. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

Photomicrographs of firn and ice samples were made under normal daylight in the instrument room of the firn station. Results of measurements of samples from various depths are tabulated, and 16 photomicrographs are presented. The firnification of the snow is primarily attributed to melt processes, and metamorphism from snow to firn is very sudden. The average diam. of the firn grains is 0.8-1.0 mm. Further growth is relatively slow, and differs for individual layers according to the climatic conditions under which they formed at the surface. Maximum grain diam. did not exceed 3 mm. The structural change with depth for ice layers is more marked than for firn layers. Thin ice crusts with a maximum thickness of 0.5 cm. form during the summer as the result of meteorological influences. They consist of a loose texture of individual grains, which later, at greater depths, grow gradually to a diam. up to 10 mm. The transition of granular ice to homogeneous bubbly ice occurs at a depth of several m. A criterion for this transition is the formation of ice bubbles from the intermediate air spaces between the grains.

SIP U6097

Etienne, Erich
ATTEMPT TO DETERMINE EXPERIMENTALLY THE THERMAL CONDUCTIVITY OF FIRN. (Versuch der experimentellen Bestimmung der Wärmeleitfähigkeit des Firns; Text in German). p.144-155 incl. tables, graphs, diagr. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

Albrecht's thermal conductivity meter consists of 2 needle thermometers connected in a bridge circuit, with a heating element wound around 1 of the thermometers. This instrument was used to determine the thermal conductivity of firn with a mean density of 0.53. The instrument is inserted into the firn, the element is heated by passing a current through, and the thermal conductivity is determined from the temperature difference between the thermometers as measured by a galvanometer. Calibration data and results of successful series of measurements are tabulated. An average thermal conductivity value of 0.00116 cal./cm. sec. °C was obtained for firn of 0.53 density at a depth of 36.5-54.5 cm. Most errors introduced in the measuring technique result from the formation of an air space around the heated thermometer due to the absence of good contact between firn and thermometer needle.

SIP U6098

Etienne, Erich
TEMPERATURE MEASUREMENTS IN FIRN. (Temperaturmessungen im Firn; Text in German). p.155-158 incl. graphs. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

Firn temperatures were measured with Hg thermometers inserted into the firn profile through holes 60 cm. deep. The holes were insulated against outside air by paper and cotton stoppers. Measurements were made at depths of 1, 3, 12, 25, 50, 100, 200, 300, 400, 450, and 550 cm. Results indicate that the temperatures at a depth of 1 cm. are almost a reflection of the air temperatures; the amplitude of the daily temperature variation at 25 cm. and at 1 m. is only 0.25 and 0.10 of that at 1 cm. respectively. A uniform temperature of 0°C exists to a depth of 5-6 m. during the summer, which changes to almost -2°C within 2 weeks after the frost begins to penetrate in Sept. It is concluded that the temperature conditions in the firn of the Sukkertoppen Highland ice correspond to those in Spitsbergen.

SIP U6099

Etienne, Erich
SUMMARY OF ALL RESULTS FOR AN ANALYSIS OF THE FIRN STRATIFICATION. (Zusammenfassung aller Ergebnisse zu eine Analyse der Firnschichtung; Text in German). p.159-177 incl. illus. tables, graphs, diagrs. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

A detailed analysis of the individual firn layers is made to correlate firn structure on the Sukkertoppen Highland ice with climatological mean values at the coastal stations. Two physical processes are differentiated: the deposition of the snow layer which slowly changes into firn of uniform density 0.52; and ablation during the warm period, accompanied by water seepage, the formation of ice layers, and icing of the firn at greater depths at the expense of the uppermost layers. A correlation is found between mean annual precipitation and coastal station observations, and between the property of a specific layer and coastal station observations. The mean density of a firn layer is an important criterion for the definition of the layers as winter and summer deposits.

SIP U6100

Etienne, Erich
THE OBSERVATIONS OF THE METEOROLOGICAL STATIONS. (Die Beobachtungen an den meteorologischen Stationen; Text in German). p.178-183 incl. tables, graphs. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

The observation of various meteorological elements at Stations Glacier Camp and Igdlo Camp are tabulated. Included are atmospheric pressure, air temperature, humidity, wind speed, and precipitation. Ablation measurements of the glacier surface indicated a value of 3.5 cm./day for the period Aug. 10-Aug. 30, and 0.8 cm./day for Aug. 30-Sept. 21.

SIP U6101

Mott, P. G.
GLACIER VELOCITY MEASUREMENTS AND PHOTOGRAMMETRIC OPERATIONS. (Gletschergeschwindigkeitsmessungen und photogrammetrische Arbeiten; Text in German). p.184-202 incl. illus. table, graphs, map. (In: Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938. ["Oxford University Greenland Expedition 1938"] by Erich Etienne. Leipzig. Universität. Geophys. Inst. Veröffentl. Ser. 2, vol. 13, 1940)
DLC, QC801.L4, v. 13

The measuring techniques and photogrammetric

operations made chiefly on the Taterat Glacier are described. Daily velocity observations were made along a profile using a Wild-Phototheodolite. Daily velocity measurements from Aug. 15-Sept. 18 are tabulated and graphed, and possible sources of measuring errors are discussed. Results indicate the importance of jerky sliding motions in the daily trend of movement processes. The release of individual jerks is attributed to mechanical processes within the glacier, independent of meteorological factors. The mean daily velocity is plotted as a function of the marginal distance. The glacier depth is calculated as a function of surface velocity according to Lagally's formula. A depth of 450 m. was calculated for the center of the glacier. A U-shaped valley floor is calculated for the glacier-bed form from the glacier velocity measurements.

SIP U6102

Sumgin, M. I.
CONDITIONS OF THE SOIL FORMATION IN PERMAFROST REGIONS. (Usloviía pochvoobrazovaniía v oblasti vechnoĭ merzloty; Text in Russian with English summary). Pochvovedenie, 26, No. 3: 5-17, 1931.
DA, 57.8 P34, v. 26

The soil forming processes in permafrost regions are limited to the active layer, the thickness of which varies from 0.20 m. near the Polar seacoast to 3-4 m. at 55° N. lat. Atmospheric, hydrologic and relief characteristics as well as soil and vegetative features are discussed in terms of factors influencing the thickness of the active layer. A soil of very fine particles subject to saturation is produced through mechanical friction and chemical weathering over long periods. The underlying permafrost forms a barrier impenetrable to roots and microbes.

SIP U6103

Watzinger, A., E. Kindem and B. Michelsen
INVESTIGATIONS OF FILLS FOR ROAD AND RAILROAD CONSTRUCTION. [1]. (Undersökelser av massentskiftningsmaterialer for vei- og jernbanebygning [1]; Text in Norwegian with German summary). Medd. Vegdirektøren, No. 6:101-122 incl. illus. tables, graphs, June 1938. 6 refs.
DPR, Unclassed periodical

Thermal conductivity, specific weight, density, pore percentage, adsorption-water content, capillarity, and grain size were determined for gravel, sand and stones, ashes with slag and locomotive flue ashes, moor, peat straw, and charcoal. A special device was used to determine the thermal conductivities as a function of water content for temperatures above and below 0°C. The thermal conductivity increases with increasing moisture for all the materials. Frost penetration is shown to be a function of heat conductivity and cold storage, which is a product of specific heat, density, temperature difference, and the heat of freezing of the water content. The specific frost conductivity resistance of the various materials is defined as the ratio of cold storage to thermal conductivity, and is calculated for all the materials as a function of water content. Results show that for all materials examined, the least frost resistance is offered in the dry state, the greatest resistance exists at a specific water content, above which, the resistance again decreases. An equation expressing the approximate frost resistance of a material layer is derived. The equation, together with annual temperature curves, is used to calculate the thickness of a replacement material to prevent frost penetration into the underlying layer.

SIP U6104

Heje, Kolbjørn
FROST ACTION WORK, ETC. BASED ON THE METEOROLOGICAL CONDITIONS IN NORWAY. (Telehivingsarbeider m.v. på grunnlag av meteorologiske forhold i Norge; Text in Norwegian). Medd. Vegdirektøren, No. 12:129-140 incl. table, graphs, map, Dec. 1943.
DPR, Unclassed periodical

The method of computing frost and heat dosages was based on the experimental results on replacement fills conducted at the Technological University of Norway. A map shows the location of 130 weather stations, 100 of which are listed by canton, region, height above sea level, and with mean, minimum and maximum values of frost- and heat-dosages. The longest observation period for any station was 1864-1941 and the shortest one 1938-1941. The significance of data of this nature is given brief mention.

SIP U6105

Eriksen, Arne
FROST DEPTH MEASUREMENTS IN THE WINTER OF 1940-41. (Telemålinger vinteren 1940-41; Text in Norwegian). Medd. Vegdirektøren, No. 10:113-117 incl. table, graphs, Oct. 1942.
DPR, Unclassed periodical

Intense, long cold spells and shallow snow covers contributed to extreme frost penetration. The result of about 300 reliable answers to a questionnaire on measurements performed were statistically analysed and tabulated in an arrangement utilizing the results of Watzinger, Kindem and Michelsen. The curves presented facilitate control between the measured and estimated depth of frost for one type of soil. Similar curves for all soil types under all conditions are recommended. Maps indicating frost dosages for the whole country should be made from maximum dosage observed locally. Such maps, together with data on frost frequency and frost penetration, are the means by which the satisfactory solution of the insulation problem can be achieved.

SIP U6106

SNOW REMOVAL ON THE FILEFJELL. PETER ROTARY SNOW CUTTER. (Snøbrøytingen på Filefjell. Peters roterende snøfreser; Text in Norwegian). Medd. Vegdirektøren, 2:17-21 incl. illus. Feb. 1939.
DPR, Unclassed periodical

Attempts to keep open the highway over Filefjell (800 to 1004 m. above sea level) were unsuccessful in 1936-37 and 1937-38 because of the adverse weather conditions. Front plows and adjustable sideplows in combination with trucks or caterpillar vehicles were inadequate. A Peter snow cutter was tested on a mountain road blocked by compacted snowdrifts, 1.5 to 3 m. high. These drifts were reduced to heights of 2 m. at a speed of 0.2 km./hr. It is believed that the Filefjell highway can be kept open for winter traffic with a Peter snow cutter.

SIP U6107

Stüve, G.
AN OBSERVATION OF UNUSUAL RIME. (Eine Beobachtung von eigentümlichem "Reif"; Text in German). Meteorologische Z. 49:36, Jan. 1932.
DWB, M(05) M589z, v. 49

Threads of ice, 3 cm. long and bunched together were observed at elevations of 1700-1800 m. where the soil was not covered with vegetation. The formations were parallel to each other, grew vertically from the ground, and each held a soil particle at the tip. The formation is attributed to ice which was forced from the soil during freezing, with the soil pores acting as a nozzle opening.

SIP U6108

Kantzenbach, E.
A CONTRIBUTION TO THE ICING PROBLEM. (Ein Beitrag zur Frage der Vereisung; Text in German). Meteorologische Z. 49:202-203 incl. diagrs. May 1932.
DWB, M(05) M589z, v. 49

The structure of an ice layer, which formed on the propellers of an airplane while the motors were being run in the open to prevent freezing of the cooling water, is discussed. The ice accretion attained a thickness of 6 mm. after 10 min. at an air temperature of -4° to -5°C, humidity of 99-100%, vapor pressure of 3-3.3 mm., no wind, and with fog present. The accretion was thickest at the leading edge and consisted of a rod-like structure. This structure is attributed to the initial formation of the intermediate air hoar deposit (Raubfrost), due to freezing of water droplets accompanied by sublimation, and the subsequent covering of this deposit by rime.

SIP U6109

Hajósy, Franz v.
THE INFLUENCE OF THE SNOW COVER ON TEMPERATURE. (Über den Einfluss der Schneedecke auf die Temperatur; Text in German). Meteorologische Z. 49:467-470 incl. tables, graphs, Dec. 1932. 1 ref.
DWB, M(05) M589z, v. 49

The influence of the heat of fusion of a snow cover on the air temperature is indicated by a frequency distribution of individual temperature values. Temperatures between 0°-2°C are more frequent than others. An analysis of data shows that the snow cover does not increase the rate of afternoon cooling. It is shown that the diurnal variation of temperature is greater on days with sunshine and snow cover than on snow-free days. The effect of a snow cover on overcast days is minimal and uncertain. It is concluded that the effect of a snow cover on temperature is smaller than had been assumed, and that the main effect is not thermal but dynamic.

SIP U6110

[Abbe, Cleveland]
MICRO-PHOTOGRAPHS OF SNOW CRYSTALS. Monthly Weather Rev. (U.S.), 28:541-542 incl. table, Dec. 1900. (Notes by the Editor)
DLC, QC983.A2, v. 28

A history of collections of photomicrographs of snow crystals is presented. Findings by their authors are reported. Crystals become more delicate, thinner and smaller as temperatures decrease. They are 3 times smaller at -10°C than at -2°C. The relative frequency of prevailing types at varied temperatures is tabulated. It is suggested that other gases and vapors present in the atmosphere, the nature of the nuclei on which the crystals form, and the transitions occurring during descent, may have a greater influence on the form of crystals than pressure, moisture, or temperature.

SIP U6111

Granier, Jean
ABSORPTION OF ELECTROMAGNETIC WAVES BY ICE. (Absorption des ondes electromagnetiques par la glace; Text in French). Compt. Rend. 179:1313-1316 incl. table, Dec. 8, 1924. 2 refs.
DLC, Q46.A14, v. 179

Values of the resistance and specific inductive capacity of ice at -12°C were determined for currents of frequency ranging from $4.3\text{-}6.7 \times 10^6$ cycles/sec. and are tabulated. The phase defect is very small for high frequencies. Capacity increases with decreasing frequencies. The resistance is constant for frequencies above 1.7×10^4 cycles/sec. The influence of temperature was studied. The resistance is 75 times larger at -30°C than at -2°C for a frequency of 6.7×10^6 cycles/sec. Ionic displacement appears to stop at a frequency of 3450 cycles/sec. at -2°C and 50 cycles/sec. at -30°C. The absorption band moves towards longer wave lengths with a decreasing temperature. A pure ice condenser could be schematically represented by 2 condensers in parallel, one with a specific inductive capacity of 2.05 and the other near 78 placed in series with a resistance varying inversely with the temperature.

SIP U6112

Baranov, I. Î A.
PERMAFROST IN THE "SCYTHIAN" TOMBS OF PAZYRYK IN THE ALTAI MOUNTAINS. (Merzlota v "skifskikh" mogilakh urochishcha Pazyryk v Gornom Altae; Text in Russian). Izvestiâ Vsesoûznogo Geograficheskogo Obshchestva, 85:269-278 incl. diagr. 1953. 4 refs.
DLC, G23.R6, v. 85

Permafrost was discovered in the Altai Mountains in the course of archeological investigations. A diagram indicates its distribution. Permafrost was found in hillocks which were the burial mounds of an ancient people. Five large mounds in Pazyryk, composed of stones and covered with mud, were up to 36 m. in diam. and 1.5-2 m. high. The remains indicated that permafrost developed shortly after burial. It is assumed that the thick stone structure of the tombs acted as a cooling chamber, which in conjunction with deep frost penetration caused the development of permafrost.

SIP U6113

Zdanovskiĭ, I. A. and E. P. Naryshkina
CLIMATOLOGICAL HANDBOOK FOR THE MOSCOW DISTRICT. (Klimatologicheskiĭ Spravochnik Moskovskoĭ oblasti; Text in Russian). Moscow, Gidrometeorologicheskoe Izdatel'stvo, 1938, 99p. incl. tables, diagr.
DLC, QC989.R6M93, 1938

Observations at more than 160 stations were used in this compilation. Normals were calculated for air temperature for 50 yr. (1881-1930), precipitation for 40 yr. (1892-1931) and wind for 22 yr. (1912-1933). Ten-day normals of snow-cover depths, as well as the mean and extreme dates of snow-cover appearance and disappearance, are tabulated. Soil temperatures were observed at 7 places having various soil types. Monthly means of soil temperature, mean and extreme depths of frost penetration, and number of days with frost at depths up to 0.8 m. are given for the observational period of 1898-1933. Climatic data of humidity and sunshine duration are presented.

SIP U6114

Bydin, F. I.
THE NATURE OF ANCHOR ICE AND COUNTERMEASURES. (K voprosu o prirode donnogo l'da i merakh bor'by s nim; Text in Russian). Trudy Nauchno-issledovatel'skogo Instituta Gidrotekhniki, Sbornik po Ledotekhnike, 1:9-58 incl. illus. tables, map, diagrs. 1933. 38 refs.
DLC, TC1.L43, v. 1

Theories on anchor ice formation developed by Al't-berg, Barnes, Lokhtin, TSionglinskiĭ, Gay-Lussac, Arago and others are reviewed and criticized. The causes of ice formation on the beds of rivers and reservoirs are discussed and the occurrence in the rivers of European Russia is mapped. Air and water temperatures in areas prone to anchor ice formation are tabulated. Conditions favorable for anchor ice formation include: a stony riverbed of high thermal conductivity, seepage of water from the riverbank, scant snow cover along the bank, a long period of low temperatures and wind, a slow current flow, and a limited supply of warmer ground water.

SIP U6115

Steinemann, S.
POLAR CRYSTAL STRUCTURE AND PIEZOELECTRICITY OF ICE. (Polare Kristallform und Piezoelektrizität des Eises; Text in German). Experientia, 9:135-136, April 15, 1953. 14 refs.
DLC, Q1.A1.E9, v. 9

X-ray and electrodiffraction experiments show 3 possible structures for ice: triagonal holohedrism, hexagonal holohedrism, and hexagonal hemimorphism. Piezo- and pyroelectricity can apply only to the hexagonal hemimorphous structure C_{6v} in which the optical axis coincides with the polar axis. Piezoelectricity of ice was investigated by the Bergmann method, consisting of measuring an applied deformation polarization, and by means of a series impedance method. The effectiveness of each method was determined separately. No piezoelectric excitation could be established. An electromechanical coupling of 10^{-3} or a corresponding piezoelectric modulus of 1.5×10^{-9} c.g.s. units would have been the lower limit for detecting piezoelectricity. Special attention was given to the selection of homogeneous crystals for the tests. It is emphasized that it cannot yet be concluded from these experiments that ice possesses a non-polar structure.

SIP U6116

Kuroda, Masawo
DYNAMICS OF SNOW COVER. Japan Sci. Rev. 1: 45-52 incl. illus. tables, diagrs. March 1949. 1 ref.
DLC, AS542.J33, v. 1

Snow strength is classified according to tension, compression and shear. An apparatus to test tensile and shearing strength is described. The compression test is replaced by a test on creep by which the deformation from a constant load at a constant temperature is measured over a long interval. A hardness test may be used to obtain a rough measurement of the strength of snow deposits. The shock method has replaced the statical load test for hardness measurements. A right angle, 1-kg. cone, 10 cm. in radius and 10 cm. high, is dropped from a height of 20 cm. The residual height of the cone above or below the surface in cm. is read as a positive or negative hardness. The effects of height of dropping and weight of hardness cone on depth of snow penetration and the variation of snow hardness with depth were measured. The stress distribution under compressive load in snow deposits was studied in new snow. The hardening process of a snow cover through vertical mixing is discussed.

SIP U6117

Fuller, M. L.
SNOW ROLLERS AT CANTON, N. Y. Monthly Weather Rev. (U.S.), 35:70-71 incl. illus. Feb. 1907.
DLC, QC983.A2, v. 35

Variations in texture and size of snowflakes are given for dry and small to moist and large flakes, wind velocity from 4-12 m.p.h. NE to 30-40 m.p.h. SW, and temperature from 10° to 34°F occurring before and during the formation of snow rollers. The largest snow rollers were 10-12 in. in diam. and length. Structurally they resembled rolls of cotton batting with centers shorter than the outer layers and in some cases missing. The layers of varied thickness averaging 0.75 in. were thinner near the axis and the rolls were lighter than snowballs of similar size. Evidently the snowflakes of light, fluffy snow are made adhesive by a sudden rise in temperature. A strong wind pushes over little projections of the surface snow which starts rolling. Rolling continues with subsequent growth until the resistances overcome the propelling power of the wind.

SIP U6118

Okada, T.
NOTE ON THE DIURNAL HEAT EXCHANGE IN A LAYER OF SNOW ON THE GROUND. Monthly Weather Rev. (U.S.), 35:450-452 incl. tables, Oct. 1907. 2 refs.
DLC, QC983.A2, v. 35

Heat exchange takes place in the upper layers when snow is 1-2 m. deep. Temperatures at depths varying from 0-30 cm. were taken hourly for 8 consecutive days with a Hg thermometer inserted vertically into the snow. The mean temperature varied from -15.02°C at the surface to -6.30°C at 30 cm. depth. The specific density of snow was measured at different depths and varied from 0.159 at 5 cm. to 0.380 at 55 cm. Variation of heat content of snow on the ground was calculated with Bezold's formula. The heat exchange is negligible below the 30-cm. depth. The average total daily heat exchange for snow is 19 gm. cal./sq. cm. which is equivalent to that of soil covered with vegetation. The heat exchange in snow is 24.3 gm. cal. on a clear day and 11.5 gm. cal. on a cloudy day.

SIP U6119

Gheury, M. E.
SPECIFIC GRAVITY OF SNOW. Monthly Weather Rev. (U. S.), 35:583, Dec. 1907; 37:98-100, March 1909.
DLC, QC983.A2, v. 35, 37

Specific gravity of snow was determined for different kinds of freshly fallen snow. The specific gravity was 0.076 for fine powdery snow occurring after 2 days of hard frost, 0.052 for fluffy adherent snow, 0.045 for snow with light, feathery star crystals, 0.087 for snow with minute compact crystals adhering firmly under pressure which fell during a strong driving wind, and 0.100 for snow formed of small crystalline grains remaining mobile under pressure. The effect of freezing on the fallen snow and the pressure of fresh snow layers upon old ones were investigated. Extreme specific gravities of 0.013 and 0.169 for very light fluffy spicules of ice and for closely packed round grains respectively are also reported.

SIP U6120

Tamura, S. Tetsu
MATHEMATICAL THEORY OF ICE FORMATION. Monthly Weather Rev. (U.S.), 33:55-59, Feb. 1905. 7 refs.
DLC, QC983.A2, v. 33

The application of Fourier's theory of heat conduction to the problem of ice formation is presented. Formulas have been developed by neglecting the change in density when water freezes into ice and assuming that the temperature of the water is everywhere and always 0°C, that the heat flows upward only, that the latent heat of fusion of ice never warms the water next to the ice. Some formulas also assume that the temperature of the upper surface of the ice is constant, others that the thickness of the ice is very small or that the temperature gradient in ice is constant. Stefan, Neumann and Forbes applying their developed formulas to ice formation in the polar seas obtained the values of 0.0042, 0.0057 and 0.00223 respectively for the diffusivity of ice. Large quantities of ice produced in fields at Bengal (India) by exposing shallow, porous earthen dishes filled with water during clear nights at temperatures of 48°-52°F show that ice formation is due in large part to radiation to space.

SIP U6121

Miller, E. R.
DEPOSIT OF ICE COLUMNS. Monthly Weather Rev. (U.S.), 33:527 incl. illus. Dec. 1905. 1 ref.
DLC, QC983.A2, v. 33

Ice formations on the ground near Cabin John Bridge, 8 mi. west of Wash. (D.C.) were observed on Dec. 25, 1905, when the temperature fell to 22°F, 3-4 days after a 2.03-in. rain. The deposit had a rough shaggy fur appearance where exposed to the sun, and a thin ice crust over the tops of the crystals in the shade. The crystals were 3 in. long, of irregular section, and 0.06-0.18 in. thick. The ice columns occurred mostly on bare ground, generally above the soil but penetrated loose and sandy soil.

SIP U6122

Am. Pub. Health Assoc. Eng. Sec. Com. Sewage Disposal
PACKAGE SEWAGE TREATMENT PLANTS; AND SPECIAL DISPOSAL PROBLEMS. Am. J. Public Health, 42, No. 5:113-119, May 1952. 4 refs.
DLC, RA421.A522, v. 42

A package sewage treatment plant treats less than 100,000 gal. of sewage per day and serves from 100-

1000 people. Depth of cover, rate of flow, and grade of sewer line are the most important factors involved in preventing freezing in collection systems in the arctic. The temperature does not vary much at a depth of 8 or more ft. in the permafrost. Satisfactory disposal offers great difficulties. A discussion of the efficiency of trickling filters in low temperature by Thomas, a statement by Clark on the likelihood of local materials usable for insulation of sewerage systems, and the warning by Rogers of the sanitary hazards of the utilidors are mentioned. The utilization of effluents and the disposal of nitrate wastes are discussed.

SIP U6123

McKinley, J. L.
SNOW MELTING SYSTEM PRACTICE AND DESIGN. Heating and Ventilating, 49, No. 8:85-86 incl. graphs, Aug. 1952.
DLC, TH7201.H4, v. 49

Data on snow-melting systems indicate that nearly 70% were installed in the last 2 years and that 10% are for areas of 6000 sq. ft. or more. Usual operating temperatures are from 120°-140°F with temperature drops varying from 20°-40°F. The design of snow-melting systems is usually based on a mean temperature of 26°F during snowfall, an average density of snow of 6 lb./cu. ft. and a melting rate of 1 in./hr. High wind velocity though important has been disregarded. It is suggested that less attention be paid to melting capability and snow density and more to maintaining an approximate surface temperature of 34°F under all weather conditions, provide ample radiation with relatively close spacing of pipes, raise automatically the temperature of the circulating medium during periods of snowfall, or wind and low temperature after snowfall. Closer spacing of pipes adjacent to non-heated areas will melt snow carried over by pedestrians.

SIP U6124

Pople, J. A.
MOLECULAR ASSOCIATION IN LIQUIDS. II. A THEORY OF THE STRUCTURE OF WATER. Proc. Roy. Soc. (London), 205A:163-178 incl. table, graphs, diagr. Feb. 7, 1951. 13 refs.
DLC, Q41.L7, v. 205A

A theory considering the majority of H-bonds in water as distorted rather than as broken is developed. Structural differences in ice and water are explained by distortion of intermolecular bonds. The H-bonds in ice become increasingly bent with rising temperatures permitting a breakdown at the fusion point. Before fusion the bending of H-bonds is restricted to maintain the lattice order. After fusion the 4 H-bonds from one molecule are able to move independently and some of the molecules move into formerly unoccupied regions of the tridymite-like ice lattice causing a volume reduction.

SIP U6125

Markov, K. K.
POLYGONAL (HONEYCOMB) FORMATIONS OF NORTH PAMIR. (O polygonal'nykh [iacheistykh] obrazovaniiakh Severnogo Pamira; Text in Russian). Izvestiia Gosudarstvennogo Geograficheskogo Obshchestva, 66, No. 3:402-407 incl. illus. 1934.
DLC, G23.R6, v. 64

Frost action is the basic factor responsible for the polygonal relief formations in the Pamir Mountains. Well-developed polygons were found on the western slope of Kok-bashi-chukur at an elevation of 5700 m. Polygons at elevations of 4700-5000 m. were 20 cm. in diam. and composed of 2 distinct parts. The slightly concave central portion composed of a mixture of homogeneous, yellow sand and gravel was surrounded by a band of gravel debris in a groove. Non-homogeneous sand is found to a depth of 25 cm. under the surface of the center. Polygons found near glaciers on the surface of morainic hills at an elevation of 4200 m. were honeycombed in structure. These formations are caused by the freezing processes in spring and early summer and melting of solid precipitation in autumn. Larger polygons (30-50 cm. in diam.) with hillocky mounds (30-40 cm. high) were observed in areas where the nocturnal temperature did not exceed 0°C.

SIP U6126

Nogami, K.
OBSERVATION OF THE DEPTH OF FROZEN SOIL BY ELECTRICAL RESISTANCE METHOD. (Denki teikō-hō ni yoru dojō toketsu no kansoku; Text in Japanese with English summary). J. Meteorological Res. 5:57-61 incl. tables, graphs, diagrs. March 1953.
DWB, Unbound periodical

A value of 27.3 kΩ was obtained for the criticial f.p. of the soil at Kushiro (Japan) from direct measurements and from Nakaya's experiments. Twenty-one twisted Cu lines, 60 cm. long, were stretched horizontally 2.5 cm. apart on a vertical frame, 50 cm. high. The frame was buried in the ground and the electrical resistance measured at 21 points from the surface to a depth of 50 cm. and the depth of the critical value, 27.3 kΩ was recorded. The depth of the frozen soil was observed throughout the winter and the results plotted.

SIP U6127

Kunii, K.
ON THE TRIAL MANUFACTURE OF SOME NEW SNOW GAUGES. (Sekisetsu no kansoku o kani-ka suru tame no sokki shisaku; Text in Japanese with English summary). J. Meteorological Res. 5:99-102 incl. diagrs. March 1953.
DWB, Unbound periodical

Various instruments designed to simplify daily measurements of snow properties were manufactured: a snow sampler of the Mt. Rose type, a

snow hardness meter which drops on the snow mantel from a constant height, a snow density meter which is 10 cm. long and made of a stainless material, and a snow thermopile of Cu-constantan wire.

SIP U6128

Kuhn, W.
FIRN INCREASE FOR 1950/51 IN SOME SWISS FIRN AREAS. (Der Firnzuwachs pro 1950/51 in einigen schweizerischen Firngebieten; Text in German). Vierteljahrsschr. naturforsch. Ges. Zürich, 96:257-261 incl. tables, diagr. Dec. 31, 1951.
DLC, Q67.Z94, v. 96

The 1950/51 winter was characterized by large amounts of snow precipitation in Nov., Jan. and Feb. The snow depth attained a maximum at the beginning of April in the lower firn areas, whereas ablation did not start until June in the higher regions. Four to 4.5 m. of snow were melted during the summer from firn areas below 3000 m., so that the annual firn increase at the end of the ablation period on Clariden was only slightly above the mean value, and was considerably below the average on Silvretta.

SIP U6129

Weiss, S. J. and D. V. Magill
OPERATING INSTRUCTIONS FOR THE MARK II SOIL TRUSS. Naval Civil Eng. Res. and Evaluation Lab. 3p. illus. graphs, diagrs. Feb. 14, 1951. (Project NY-440 007-1)
SIPRE files, S-1058

The soil truss is used to determine empirical values of the angle of internal friction and of the coefficient of cohesion. It consists of 2 pivoted legs, the anchor leg providing stability and the active leg applying the force to the soil or snow being tested. The applied force is transferred to the legs through a helical spring. A level site 10 x 10 ft. representative of the soil or snow of the area being tested is chosen. The cylindrical frame is slipped on the anvil of the active leg, the spade on the anchor leg is forced into the soil and the active leg located at any desired protractor reading. The wooden pressure block is placed over the cylindrical frame, which is forced into the soil or snow to a depth indicated by a groove. The soil or snow is cleared away from the front side of the frame, a downward force is applied until shear failure occurs and the pressure is read. Three to 5 tests are needed at different protractor settings to determine the characteristic curve of the soil or snow tested. Notes on the maintenance of the soil truss are included.

SIP U6130

Mersman, W. A., W. P. Berggren and L. M. K. Boelter
THE CONDUCTION OF HEAT IN COMPOSITE INFINITE SOLIDS. Univ. Calif. Pub. Eng. 5, No. 1:1-21 incl. tables, graphs, Dec. 15, 1942. 11 refs.
SIPRE files, S-1088

Analytical and graphical solutions for temperature as a function of position and time in a dissimilar pair of semi-infinite solids placed in imperfect contact on a plane interface are presented. The initial temperature distributions vary only with the distance from this plane. The analytical solution involves infinite integrals which can be evaluated for initial distributions represented by polynomials within successive intervals. These solutions are useful in predicting ground temperature variations with time and depths after a sudden heavy snowfall.

SIP U6131

Brunner, Thomas
ENERGY REQUIREMENT TO PREVENT ICING OF POWER LINES. (Energiebederf zur Verhütung von Vereisungen an Freileitungen; Text in German with English summary). Z. angew. Math. Phys. 4:24-34 incl. tables, graphs, diagrs. Jan. 15, 1953. 7 refs.
DLC, QA1.Z37, v. 4

Ice was produced in a wind tunnel at a temperature of -10°C and at wind speeds between 0-20 m./sec. by spraying water through a specially constructed nozzle. An electrically heated Al rod, 27 cm. long, 10 mm. outside diam. and 6.8 mm. inside diam., was vertically exposed to the spray at varying wind speeds and was heated to varying degrees. The influence of evaporation, rate of rime formation, liquid water content, droplet size, and stream direction on the energy requirement is discussed. The amount of energy required to keep the rod free of ice is calculated. It is shown that at a temperature of -15°C and a wind speed of 20 m./sec., 1.1 watt/sq. cm. of projected area are sufficient to keep the rod clear. This result agrees with Nusselt's theory, but is half as great as Schaefer's value.

SIP U6132

Henry, Alfred J.
THE DISAPPEARANCE OF SNOW IN THE HIGH SIERRA NEVADA OF CALIFORNIA. Monthly Weather Rev. (U. S.), 44:150-153 incl. tables, March 1916.
DLC, QC983.A2, v. 44

The weather conditions which may modify or control the disappearance of snow were investigated. The depth of snow which disappeared during Feb., March, and April at Fordyce Dam, Summet, and Tamarack (Calif.) for the period 1908-1915 was calculated from snowfall and snow-depth records. Scant snowfall and low temperatures produce little snow melt; heavy precipitation and relatively high temperatures produce great melting. Air temperature and wind are the principal factors in the disappearance of snow. There is no apparent relation between small changes in temperature and the rate of snow melt. Freshly fallen snow disappears faster than a cover of old, well-packed snow. Snow depth decreases by melting and absorption into unfrozen ground, by settling and packing under the influence of high winds, and by evaporation. The

greater the altitude, the slower the melting. Low temperature and little wind favor snow conservation by reducing evaporation to about 0.75 in./day. High temperature, brisk wind, and strong sunshine may cause a loss of 10 in./day for freshly fallen snow and 3-4 in./day for old snow.

SIP U6133

Kadel, Benjamin C.
MOUNTAIN SNOW MEASUREMENTS. Monthly Weather Rev. (U. S.), 41:159-161, Jan. 1913.
DLC, QC983.A2, v. 41

Experience gained from 2 years of work in the snow fields of the Rio Grande National Forest in Mineral County (Colo.) at elevations exceeding 9000 ft. is presented. Snow melts on south slopes within a few days after falling without contributing to river flow. It is concluded that on such slopes snow evaporates. Snow lying on north slopes does not evaporate, and shows no melting until higher spring temperatures occur. The best place for making snow measurements to estimate its water storage is on a north slope of about 20° in an open space in a stand of timber. A northeasterly slope is better than a northwesterly one if a true north slope is not available. Methods of measuring the depth and density of the snow are described.

SIP U6134

Jones, Harris A.
EFFECT OF DUST ON THE MELTING OF SNOW. Monthly Weather Rev. (U. S.), 41:599, April 1913.
DLC, QC983.A2, v. 41

Snow mixed with dust originating from the desert plains of N. M. fell at Wagon Wheel Gap (Colo.) during the early part of a snowstorm. A dust layer 0.125 in. thick was left under 6 in. of snow by the end of the storm. The dust blanket intercepting insolation caused the upper layers of snow to melt within 2-3 days, exposing the dust blanket at the surface. All subsequent snow melted quickly into the lower layers increasing their density and keeping the dust at the surface. The melting season occurred 1 month ahead of normal regardless of below-normal temperatures. This advance is attributed to the presence of the dust blanket.

SIP U6135

Barnes, Howard T.
SOME PHYSICAL PROPERTIES OF ICEBERGS AND A METHOD FOR THEIR DESTRUCTION. Proc. Roy. Soc. (London) 114A:161-168, illus. tables, March 1, 1927. 2 refs.
DLC, Q41.L7, v. 114A

Icebergs originate from glaciers in Greenland. They have a granular structure, large amounts of air are pressed into their mass resulting in the green pressure ice. Melted glacier ice-water refreezes free of air in cracks and crevasses forming deep blue bands. Melted iceberg ice is at least as pure as distilled water. The relative volume of air in iceberg ice is from 7.4-15.1%. Analysis of the iceberg air indicates that its composition is similar to that of atmospheric air. The disrupting action of the high temperature produced by Thermit firing in icebergs is reviewed.

SIP U6136

Ångström, Anders
THE INFLUENCE OF DRAINAGE ON FROST SUSCEPTIBLE LAND. (Avdikningens inverkan på frostländigheten; Text in Swedish). Grundförbättring, 1:133-147, 1947.
DLC, S605.G75, v. 1

Divergent theories and interpretations of some earlier works on the prevention of frost action in peat bogs are summarized and references are given to the respective investigators. The evidence indicates that what holds true for a certain topography, type of field, soil consistency and vegetation does not necessarily hold elsewhere under similar conditions. A research program on theory and practice is proposed to study all factors of direct significance to the daily variation of temperature (moisture, condition and vegetation of the field) as well as the values of radiation, evaporation, heat conductivity and capacity.

SIP U6137

Babkov, V. F. and others
INFLUENCE OF WATER-THERMAL REGIME OF THE GROUND ON THE RESISTANCE TO EXTERNAL LOADS. (Vliianie vodno-teplovogo rezhima gruntov na soprotivlenie vneshnim nagruzkam; Text in Russian). p.222-223 incl. graphs, diagrs. (In: Gruntovedenie i mekhanika gruntov, by V. F. Babkov and others, Dorizdat, Moscow, 1950). 2 refs.
DLC, TA710.G77, 1950

Increased moisture content of ground results in the lowering of its deformation coefficient. This change is indicated graphically for various months. Poor trafficability is caused by reduced evaporation in the autumn and by ground and snow thaw in the spring. Trafficability of dirt roads is influenced by drainage, ground-water table and quality of ground. A graph indicates the dependence of calculated deformation coefficients of various soils on climatic and hydrogeological conditions.

SIP U6138

Al'tberg, V.
ANCHOR ICE AND PROBLEMS OF ANGARA, ENISEI AND VOLGA. (Donnyĭ led i problemy Angary, Eniseĭa i Volgi; Text in Russian). Za Industrializatsiiu Sovetskogo Vostoka, No. 2:125-137 incl. illus. 1932. 4 refs.
DLC, HC481.A1Z3, 1932

Extensive frazil and anchor-ice formations prevent development of hydroelectric stations on large Siberian rivers. Control of these winter regime phenomena is

essential to the electrification of Siberia. The investigations at the Valkhov station showed that supercooling the water to -0.038°C produced enough frazil and anchor ice to clog the racks and grates of turbines and lower the electric output considerably. This condition arises before the rivers and forebays are ice-covered. Supercooling results from low air temperature, strong winds, large exposed water surfaces, and rapid mixing of water layer from the surface to the bottom which accelerates the formation of embryonic ice. A stable ice cover does not form readily at a river speed of 2 m./sec. during the ice flow. Peculiar winter regime conditions o the Angara River are described which does not freeze even at -30°to -40°C air temperature. Siberian rivers are characterized by record-breaking ice jams and icings which make their harnessing for electric power difficult.

SIP U6139

Budʃuk, V. P.
HEDGES--A RELIABLE METHOD OF SNOW RETENTION. (Kulisy--Nadezhnyĭ sposob snegozaderzhaniʃa; Text in Russian). Dostizheniʃa nauki i peredovogo opyta v sel'skom khozʃaĭstve, No. 6:68-69, June, 1953.
DLC, Slavic unclassified

Sowing mustard seeds which grow to heights of 125 cm. before frost is described and recommended as an effective snow retention measure. Seeds are sown at approximately 100-200 gm./ha. The snow cover reached a height of 85 cm. in Dec. and 90 cm. in March and supplied about 2500 cu. m. water/ha.

SIP U6140

Babkov, V. F.
EFFECTIVENESS OF SNOWDRIFT PREVENTIVE DEVICES MADE FROM LOCAL GOODS. (Nablʃudeniʃa za rabotoĭ snegozashchitnykh sredstv iz mestnykh materialov; Text in Russian). Stroitel'stvo Dorog, 6, No. 8-9:3-6 incl. table, diagrs. 1943.
DLC, TE4.S73, v. 6

Stems of sunflowers, weeds, and straw were used during the wartime for the prevention of snowdrifts. The effectiveness of these materials in relation to their supports, meteorological conditions and relief was investigated. Diagrams show the preventive effect of different supports. The most effective devices were fences, 1.5-2 m. high, with strips spaced about 5-10 cm. apart. Snow fences of weeds and straw were satisfactory. Optimum distance from the road depends on the fence structure and relief characteristics, and can be calculated from the suggested formulas. Rearrangement of snow fences during winter increases their effectiveness. Vertical insertion of sunflower stalks into snowbanks prevented snowdrift formation under moderate storm conditions.

SIP U6141

Kokorin, F.
WINTER MAINTENANCE OF A BACK ROAD. (Zimnee soderzhanie odnoĭ iz dorog tyla; Text in Russian). Stroitel'stvo Dorog, 6, No. 8-9:8-9 incl. table, diagrs. 1943. 1 ref.
DLC, TE4.S73, v. 6

A winter detour was constructed in the winter of 1942-43. The open spaces of a watershed were mainly selected for the detours. Snowdrift preventive measures were used only near bridges and in regions where the highway was heavily trafficked. Scrapers, rollers and other devices were applied for snow compaction. It was necessary to compact the snow up to densities of 0.45-0.50 and to open the road for traffic 10-12 hr. after compaction. Good compaction results were obtained from multi-runner tractor sledges. Snow fences of wood strips, brushwood as well as snow trenches and snowbanks were good measures for snowdrift prevention. Snow fences retained up to 50,000 cu. m. snow/sq. km. and snow trenches about 20,000 cu. m./sq. km.

SIP U6142

Vostrov, A. I.
THE OPERATION OF AN ICE HIGHWAY. (Iz opyta ekspluatatsii ledovoĭ avtomagistraly; Text in Russian). Stroitel'stvo Dorog, 6, No. 8-9:11-12 incl. illus. diagrs. 1943.
DLC, TE4.S73, v. 6

An ice highway was constructed over Ladoga Lake during the blockade of Leningrad and was operated under difficult conditions of continuous bombardment of enemy aircraft and artillery. Specific ice regimes of the lake with frequent changes of temperature and wind and the presence of unfrozen water spaces were subjected to oscillations of water level under the ice and the formation of ice fissures. The possible load was calculated by observing ice thicknesses regularly. Increases in ice thickness depended on the depth of the water reservoir and the water flow in it. The growth in ice thickness was most intensive in areas of small depth and consequent lower water temperature.

SIP U6143

Goncharenko, V. A.
PREVENTION OF SNOWDRIFTS LOWERS THE COST OF ROAD CLEARANCE. (Zashchita dorog ot snezhnykh zanosov snizhaet raskhody na snegoochistku; Text in Russian). Stroitel'stvo Dorog, 6, No. 8-9:6-7 incl. table, diagrs. 1943.
DLC, TE4.S73, v. 6

Snowdrift prevention on the roads in the Moscow region considerably lowered general road maintenance costs during the winter of 1942-43. A 3-way system used in regions susceptible to snowdrifts consisted of a line of snow fences and 2 lines of snowbanks behind the fence line. Snow was removed from roads when the temperature was lower than -5°C and the snow at least 10 cm. deep. Snow was removed

immediately after wet snow precipitation and air temperatures near the f.p. tending to drop. Snowdrifts without snowfalls did not endanger the roads, because the snow was transferred across the road. The fuel consumption for snow removal in 1942-43 was about half of that in 1941-42 when drift preventive methods had not been completed.

SIP U6144

Ⱥkhontov, N. S.
SNOW AND SNOW COVER. (Sneg i snegovoĭ pokrov; Text in Russian). p.20-21 incl. tables. (In: Materialy po klimatologii Rȃzanskoĭ gubernii, by N. S. Ⱥkhontov, Rȃzan', 1925)
DLC, QC989.R8R, 1925

Snow conditions in the Rȃzan' province are described and normals obtained over a 33-yr. period are presented. The ground is usually snow-covered from Oct.-May. The snow depth reaches a maximum, an average of 35-40 cm., in late Feb. or early March. Snow falls an average of 60 days/yr. and a monthly maximum of 11-12 days occurs during Dec.-Feb. The density of the snow during 1923-1925 varied from 0.2 in Feb. to 0.34 at the beginning of the snow-melting season in late March. Deep snow usually prevents intensive soil freezing.

SIP U6145

Horton, Robert E.
THE MELTING OF SNOW. Monthly Weather Rev. (U. S.), 43:599-605 incl. tables, graphs, diagrs. Dec. 1915.
DLC, QC983.A2, v. 43

Snow density tests performed in Feb. and March 1914 at Albany (N. Y.) are tabulated. The depth was 27.75 in., with a water equivalent of 2.04 in. when the measurements began after a heavy snowfall. The progressive changes in depth, density and water equivalent of the snow accumulation are plotted and analyzed in relation with the prevailing maximum and minimum temperatures. Snow settles with gravity at temperatures below freezing. Surface meltwater or rain percolates through snow at or near the f.p. and part of the water adheres to the snow as a capillary film. Snow in temperature equilibrium with water will support a column of water against gravity equal to 3-5 times its density in in. of height. The transmission constant for packed snow of density 0.64 is about 2.28 in. depth/min. The snow-melting rate depends on the rate of heat absorption of the snow surface and is about 0.04-0.06 in. depth of water in 24 hr. per degree of temperature above 32°F. The melting of snow contributes more to ground water and less to surface run-off, when infiltration is possible, than an equal volume of rain on a bare surface.

SIP U6146

Alciatore, Henry F.
SNOW DENSITIES IN THE SIERRA NEVADA. Monthly Weather Rev. (U. S.), 44:523-527 incl. tables, Sept. 1916. 6 refs.
DLC, QC983.A2, v. 44

The 438 measurements of mean density and depth taken in the Sierra Nevada are tabulated in numerical order according to depths. A total of 90% of the densities fall between 0.40 and 0.49. The mean densities for snow layers of different depths in 10 in. steps show that equal mean densities are observed at equal depth for widely separated locations at different elevations. The average density of a snow cover at the close of winter depends mainly on the atmospheric conditions under which the layers were deposited and the age of the snow cover. Snow density in late spring does not vary directly with depth, pressure or altitude of the cover. Abnormally high or low densities may occur at any depth in a snow cover. The densities of the lowest layers of a snow cover cannot be formulated from measurements of depth or pressure of its top layer.

SIP U6147

Fletcher, Joseph O. and Lawrence S. Loenig
FLOATING ISLANDS IN THE ARCTIC OCEAN. Spec. Rept. No. 3, 375th Reconnaissance Squad. (VLR) Weather, 30p. incl. illus. Sept. 1, 1950. 6 refs.
DN-HO, GB2401F6.

Two floating ice islands, T2 and T3, were discovered with only a limited amount of search. They are wedge-shaped and their surface ice is corrugated, presenting a system of parallel troughs and ridges never observed on ordinary pack ice. The corrugations are probably due to mechanical stress during the process of formation. It is believed that other floating ice islands have been sighted and that mechanisms exist which could produce floes many miles across and a few hundred ft. thick impervious to crushing by sea-ice, 6-12 ft. thick.

SIP U6148

Speerschneider, C. I. H.
THE STATE OF THE ICE IN DAVIS-STRAIT. Medd. Danske Meteorologiske Inst. No. 8:5-53 incl. tables, graph, 1931.
DN-HO, GB2401D4D26

The summary is based on detailed extracts from the logs kept in 7-8 ships in the Davis Strait, diaries kept in the colonies, books of travels, and reports received by the Danish Meteorological Institute. The great ice years are due to direction and force of the prevailing wind rather than to unusually great masses of ice. A severe ice year should be called year with pronounced or abnormal wind conditions because the wind is the source and the condition of the ice is the visible effect. A graph showing the state of ice in Davis Strait from 1820-1930 is appended.

SIP U6149

Mark, Herman
MEASUREMENTS OF SNOW PROPERTIES IN AUGUST, 1942, AND A FEW APPLICATIONS OF THEM, SEPTEMBER 16, 1942. Polytechnic Institute of Brooklyn, 10p. Sept. 1942. (Photostat)
DN-HO, GB2404, Mark 1942

Properties of the various kinds of snow are discussed. Results are given of numerous snow measurements taken over a period of several days. A snow chart made for each day shows how the characteristic constants of the snow varied during that day. These charts are used when comparing vehicle test runs of different days. A chart made on a bright, mild day showing all the characteristic changes of density, temperature, water content, shearing strength, and penetration of the snow is compared with one for a rainy day during which no significant changes in snow properties occurred. Methods and equations are developed whereby the information gained during this study, together with Haefeli's measurements, can be used in computing and analyzing the climbing performance and power consumption of vehicles operating in various snow conditions. Charts are not included in photostatic copy. (Author's abstract)

SIP U6150

Reineck, H. E.
SNOW CRYSTAL — IMPRINTS IN MUD. (Schneekristall — Abdrücke im Schlamm; Text in German). Umschau, 53:80 incl. illus. Feb. 1, 1953. 3 refs.
DLC, AP30.U5, v. 53

Snow-crystal imprints were obtained by pouring fine-grained, wet marl, from which the coarsest impurities had been separated, into flat dishes and exposing them outside after the marl had settled and the water was poured off. Ice needles formed in the marl paste if freezing weather continued. The snow crystals which fell on the moist, but not yet frozen areas of the marl, acted as crystallization nuclei.

SIP U6151

Varsanof'eva, V. A.
GEOMORPHOLOGICAL OBSERVATIONS IN NORTH URAL. (Geomorfologicheskie nabliûdeniâ na Severnom Urale; Text in Russian). Izvestiâ Gosudarstvennogo Geograficheskogo Obshchestva, 64, No. 2:105-171 incl. illus. map, diagrs. 1932. 11 refs.
DLC, G23.R6, v. 64

Frost action is the basic factor in rock disintegration and the formation of soil rings at elevations over 700 m. in the Northern Urals. Insolation and chemical weathering are negligible factors. Diurnal temperatures fluctuate widely around 0°C producing freezing and thawing in cracks which result in rock fragmentation and the distribution of splintered rocks covering the slopes and mountain tops. The depth of frost action is determined by the depth of the permafrost table.

SIP U6152

Lehmann, K.
DISCUSSION ON GROUND TEMPERATURES. (Abhandlung über Bodentemperaturen; Text in German). Veröffentl. Geophysikalischen Inst. Univ. Leipzig, Ser. 2, 15, (Anniversary vol.): 79-92 incl. graphs, 1949. 11 refs.
DLC, QC801.L4, v. 15

Ground temperatures were measured with 6 resistance thermometers at depths of 5, 10, 25, 50, 75 and 100 cm., and were continuously recorded by a 6-color recorder. The effect of abnormally high air temperatures in May 1947 and that of an extremely severe winter in Jan. 1947 on the ground temperatures were studied. The interrelationship between the parameters temperature, time, and depth is plotted. A lag of 2 days was noted between the temperature decrease at 5-cm. and 10-cm. depth under a 12-cm. snow cover. The temperatures remained constant at depths greater than 25 cm. beneath a snow cover. Large diurnal air temperature variations on a clear, winter day caused no significant changes in ground temperatures under the snow cover.

SIP U6153

Finkel'shteĭn, ÎA. B. and D. P. Mal'kovskiĭ
GENERAL INFORMATION. (Obshchie svedeniîa; Text in Russian). p. 6-16 incl. table, graph, diagrs. (In: Ottaivanie merzlykh gruntov dlîa prokladki podzemnykh kommunikaîiĭ by ÎA. B. Finkel'shteĭn and D. P. Mal'kovskiĭ, Moscow-Leningrad, Gosudarstvennoe Izd-vo Lit-ry po Stroitel'stvu i Arkhitektura, 1952).6 refs.
DLC, TA713.F55, 1952

Frozen ground may be classified into 6 groups, some of which possess a viscosity to resist breakup by hydraulic hammers. Such ground is thawed by heating to 2-3°C. A temperature of -2°C is sufficient under certain conditions. The heat necessary to thaw ground depends on its temperature and heat capacity, the latter being conditioned by its structure and moisture content. Heat loses in thawing frozen ground with 10 and 30% moisture content are tabulated. A schematic distribution of heat in thawing deeply frozen ground and the frost penetration during Nov.-May 1943-44 in the Moscow region are illustrated. Practical methods of thawing by means of various needles are discussed.

SIP U6154

Sveshnikov, P. I.
THE CLIMATIC CONDITIONS OF ZLATOUST OF THE UFA PROVINCE. (Ocherk klimaticheskikh uslovi gor. Zlatousta Ufimskoĭ gubernii; Text in Russian). Ufa, 1911, 112p. incl. tables.
DLC, QC989.R6Z6, 1911

Observational data on climatic characteristics covering the period of 1837-1910 are presented. Monthly data for each year are tabulated and discussed. The Zlatoust values are compared with those of Ufa and Chelîabinsk and indicate climatic peculiarities in a large area of the Central Urals. The snow cover lasts an average of 176 days (Oct.-April) in the Zlatoust region with a maximum of 209 days in 1902 and minimum of 150 days in 1893. A maximum snow-cover depth occurs in March, the average maximum being 73 cm. and extreme being 119 cm. The depth does not drop below 31 cm. dur-

ing Jan.-Feb. The Aya River was usually ice-covered from Nov. 2-April 25 according to data of 1890-1910. The earliest freeze-up occurred on Oct. 9 and the latest break-up on May 10. The river opened twice in Nov. and secondary freezing took place. Data of the ice regime in a mill pond of the Aya River in Zlatoust are tabulated for the period 1839-1889.

SIP U6155

Galimskiĭ, V.
SNOW CONTROL ON ROADS OF THE BAR NORTH. (Snegobor'ba na dorogakh Kraĭnego Severa; Text in Russian). Stroitel'stvo Dorog, 6, No. 8-9:9-11 incl. illus. tables, 1943.
DLC, TE4.S73, v. 6

Experience of military road operations during the winters 1941-42 and 1942-43 showed some peculiarities of snow removal procedure caused by intensive and long-lasting snowstorms. Snowdrifts were observed 61 times during Jan.-May 1942 and 54 times during winter of 1942-43. The wind velocity accompanying snowstorms reached 10-15 m./sec. and the usual strip snow fences were torn down. Better snow prevention was obtained with strip snow fences, 1.5-2.0 m. high, located at a distance from the road equal to 20-40 times the height of the snow fence. The second line of snow fences was placed 15-20 m. from the first line in regions of heavy snowdrifts. Rearrangement of snow fences increased their effectiveness. Snowbanks and snow trenches were ineffective for snowdrift prevention. Roads were kept open continuously with rotary snowplows like the Niagara or Snogo.

SIP U6156

Vlăcheslavov, I. N. and L. I. Zakharov
SMOOTHER SNOWBANKS. (Razravnivatel' snezhnykh valov; Text in Russian). Stroitel'stvo Dorog, 6, No. 8-9:18-19 incl. diagrs. 1943.
DLC, TE4.S73, v. 6

Leveling snowbanks is an important measure in preventing snowdrifts on roads. Better results are obtained when snowbank sides are sloped at 1:6-1:10. Simple devices for mechanizing such operations are described. H-beams of iron, 5.5 m. long, are used as runners on which are installed 2 thick, wooden rods with a blade 4-4.5 m. long, 0.6-0.7 m. wide and 10-12 mm. thick. The position of the blades can be changed by means of a winch installation. A wooden trapezoid blade, 2.5 m. x 0.8 m. x 1.25 m., can be rotated around the vertical axis to change the distance from the snow surface. Such a cutter connected to a tractor ChTZ-65 was tested in 1942 and performed satisfactorily. Further experiments indicated that the size of the blade can be increased to 5 m. in length and 0.8-0.9 m. in height.

SIP U6157

Roginskiĭ, N. O.
PECULIARITIES IN CONSTRUCTION OF COMMUNICATION LINES IN REGIONS OF INTENSIVE GLAZE. (Osobennosti ustroĭstva liniĭ v gololednykh raĭonakh; Text in Russian). p.165-166 incl. illus. (In: Spravochnik po STsB i Svĭazi, vol. 1, [4th ed.], by G. K. Kozhukhov and others, Moscow, Transzheldorizdat, 1937)
DLC, TF615.R6, 1937

Glaze regions are considered dangerous when the deposit is 3 cm. or more in thickness. In such areas wooden poles for communication lines are set into foundations similar to those used in railroad construction. The number of poles per km. is increased to 40. Cu wires not less than 5 mm. in diam. and bimetallic wires not less than 4 mm. in diam. are recommended. Large porcelain insulators (TF1 type) are used.

SIP U6158

Zenker, H.
GROUND FROST IN HALLE/SAALE 1911 TO 1935. (Über den Bodenfrost in Halle/Saale 1911 bis 1935; Text in German). Angew. Meteorologie, 1: 172-180 incl. tables, graphs, June 1952. 15 refs.
DLC, G.P.R.R.

Daily measurements of soil temperature made at 8 a.m. at depths of 5, 10, 15, 25, 50, 75, 100, and 125 cm. from 1911-1936 were analyzed with reference to the depths of frost penetration, and the number of days with soil frost (frost in the soil). Frost penetration during cold winters and the influence of cold temperature on the soil at Halle/Saale are compared with those at Krüssau (1946-47) and Giessen (1939-40). An analysis of the frost frequency shows that the maximum is associated with anticyclonic and the minimum with cyclonic weather, and that the New Year's thaw in Germany divides the winter season into 2 distinct periods: a relatively short prewinter marked by frost temperatures at the 5-cm. depth and midwinter where frost penetrates to a depth of 15 cm. Tables and graphs indicate data on frost penetration at Halle for every year of the period 1911-1936, mean number of days with temperatures below 0°C and number of days with temperatures less than 0°C at 5 cm., frequency of soil frost at depths of 5, 15, and 25 cm. and the beginning of frost periods at specified depths. (Meteorological Abstracts)

SIP U6159

Finkel'shteĭn, ĨA. B. and D. P. Mal'kovskiĭ
SURFICIAL THAWING OF FROZEN GROUND. (Poverkhnostnoe ottaivanie merzlykh gruntov, Text in Russian) p.16-36 incl. illus. tables, diagrs. (In: Ottaivanie merzlykh gruntov dlĩa prokladki podzemnykh kommunikatsiĭ, by ĨA. B. Finkel'shteĭn and D. P. Mal'kovskiĭ, Moscow-Leningrad, Gosudarstvennoe Izd-vo Lit-ry po Stroitel'stvu i Arkhitektury, 1952). 1 ref.
DLC, TA713.F55, 1952

Flue gases are conducted through a steel plated duct 10-12 m. long over frozen ground free of snow or ice. The duct is provided with a fireplace and a 2-m. smokestack at opposite ends and is covered with an insulating layer 10-12 cm. thick. Better results are obtained with double-walled ducts insulated with slag. The ground is heated uniformly by shifting the fire-box at intervals. Wood, coal or petroleum is burned; the special arrangements for each fuel are described. The ground is thawed electrically (using 65 to 380-v. current) by horizontal electrodes placed 15-85 cm. apart and covered with sawdust moistened with a salt-water solution. Thawing frozen ground with heat-reflecting electric furnaces is described in detail.

SIP U6160

Chubukov, L. A.
CLIMATE OF THE ARID REGIONS AND THE INFLUENCE OF THE FOREST BELT ON ITS MODIFICATION. (Klimat zasushlivykh raĭonov i vliĭanie polezashchitnykh lesnykh polos na ego izmenenie; Text in Russian). Moscow, 1951, 24p. incl. diagrs. 9 refs.
DLC, QC989.R49C48, 1951

The climatic peculiarities of arid regions and their modifications as effected by forest shelter belts are analyzed. Increases in air humidity and soil moisture are the most important contributions of the forest belts. The type of forest belt determines the character of the snow cover distribution. Narrow belts, with the wind blowing through them produce a more even snow-cover distribution in the area. Compact belts up to 200 m. wide accumulate the major part of snow within them. Large groups of shelter belts prevent snowdrifts and cause reduced soil freezing, which effects better water-infiltration into soil through earlier spring thawing. Observations indicate that surface run-off is reduced by 50% and moisture in summer is increased considerably within the upper 1-1.5 m. of ground.

SIP U6161

Shchitov, A. S.
"PENITENT" SNOW. (Kaĭshchiĭsĭa sneg; Text in Russian). Priroda, 42, No. 8:110-111 incl. illus. 1953. 1 ref.
DLC, Q4.P8, 1953

Snow penitentes were formed in Stavropol during early March 1952. These formations in city parks were 20-50 cm. long, leaned at angles of 25°-30°, and occurred under sunny skies at daily temperature ranges of +2° to -1°C with intensive snow-melting at noon. The dissimilar melting rate was favored by dissimilar densities and impurities in the snow cover. The angle of inclination of the figures closely corresponded to the altitude of the sun at noon. Studies indicated that melting occurred only on the sunny side of the formations and that the meltwater froze in the lower layers of the snow cover. These weather conditions also induced excessive evaporation.

SIP U6162

Langille, R. C., W. M. Palmer and L. G. Tibbles
S-BAND RADAR ECHOES FROM SNOW. Rept. No. 26, CAORG, 29p. incl. tables, graphs, diagrs. June 14, 1945.
DWB, MO1.81C212r, No. 26

The nature of radar echoes from snow, obtained when snow was present in the absence of rain, is studied. Heavy snow was detected on 5 occasions with maximum ranges varying from 30-65 mi. A moderate snowfall which grounded all aircraft was not detected even at the minimum range of 10 mi. Rain and snow with equal water content produce the same echo and are detectable to the same range. S-band radar can detect important storm areas in summer to a radius of about 100 mi., but hardly detects any weather in winter beyond 50 mi. and misses some important snow even at 10-20 mi. Regions of moderate and heavy snowfall must be made safe for flight by radar airport control and guided landing.

SIP U6163

Canada. Dept. of Mines and Technical Surveys
AN INTRODUCTION TO THE GEOGRAPHY OF THE CANADIAN ARCTIC. Geographical Branch, Can. Geography Information Ser. No. 2, 118p. incl. illus. maps, 1951. 53 refs.
DLC, G.P.R.R.

Land, air, water, soils, vegetation and wildlife in the Canadian Arctic are described. Notes are given on discovery, exploration, white settlements, the Canadian Eskimo, transportation, communications, economic resources, government and social services. The direction of movement of drifting sea ice is determined by ocean currents and winds. Ice drifts along with the major ocean currents, but changes in prevailing wind cause deviations, and ice conditions in any season are determined by the weather of that season. The dates of formation and break-up of sea, river and lake ice are discussed. Permafrost occurs wherever winter freezing exceeds summer thawing. Permafrost prevents normal drainage and summer thaws produce solifluction. The polygonal soil structure common in the arctic is due to processes not fully understood.

SIP U6164

Snow, Ice and Permafrost Research Establishment
INSTRUCTIONS FOR MAKING SNOW OBSERVATIONS. SIPRE Instruction Memo. I, 7p. incl. illus. April 1953.
DN-HO, GC2401U5315

Snow observations are made to provide data on the properties and types of new and old snow in various sections of the world and these data are used in associating the changes in physical features and properties of snow on the ground with meteorological variables and time. Measurements are recorded for each new snowfall and weekly observations are made on the accumulated snow on the ground. A permanent observation site should be selected where

the snow will not be disturbed. The dominant features of the snow surface should be noted where little drifting occurs. A snow profile with working face exposed to the north should be cut each week and the layers numbered from the ground upward. The snow crystals in each layer must be classified and the density, temperature, and hardness index for each layer measured. Instructions for the use of the Canadian Hardness Gage to determine snow hardness are supplied. A sample of a snow observation card is included.

SIP U6165

Jurva, Risto
ATLAS OF ICE CONDITIONS IN THE BALTIC SEA ON THE COASTS OF FINLAND. (Atlas der Eisverhältnisse des Baltischen Meeres an den Küsten Finnlands; Text in German). Suppl. Fennia, 64, No. 1, 51p. incl. graphs, maps, 1937.
DLC, G23.G4, 1937

The state of ice in the various seas around Finland is indicated on a series of maps, and the ice thicknesses outside the fast coastal ice are plotted. The various types of ice are differentiated and the extent of the ice is indicated. Periods with ice for very short, average, and very long winters are plotted according to the number of weeks with varying probabilities.

SIP U6166

Kaminskiĭ, A. A. and E. S. Rubinshteĭn
CLIMATOLOGICAL HANDBOOK OF THE USSR. PART 1. EUROPEAN PART OF USSR. (Klimatologicheskiĭ Spravochnik po SSSR. Vypusk 1. Evropeĭskaîa chast' SSSR). Leningrad, Glavnaîa Geofizicheskaîa Observatoriîa, 1932, 261p. incl. tables.
DLC, QC989.R6L54, 1932

Mean and extreme climatic data obtained from long periods of observations are presented for about 550 stations of the European part of the USSR. The mean values of air temperature were calculated from a 35-yr. period or reduced to it. Precipitation data were derived from a 25-yr. period. The 10-day normals of snow-cover depth, mean and extreme data on the appearance and disappearance of snow cover are tabulated. Regular soil temperature observations using standard Lamon's thermometers were obtained in the USSR beginning in 1890 to depths of 1.6-3.2 m. Monthly and annual normals of soil temperature, mean number of days with temperatures below the f.p., mean and extreme depths of frost penetration are presented. Comparative soil temperature observations under bare and grass-covered soil surfaces are given for some areas. Climatic data on wind, humidity and sunshine duration are given.

SIP U6167

Shvetsov, P. F.
ROLE OF PERMAFROST AND SUBPERMAFROST WATER IN THE HYDROLOGY OF INDIGIRKA AND ÎANA RIVERS. (Rol' vechnoĭ merzloty i podmerzlotnykh vod v gidrologii basseĭnov rek Indigirki i ÎAny; Text in Russian with English summary). Izvestiîa Akademii Nauk SSSR, Seriîa Geologicheskaîa, No. 6:137-152 incl. tables, graphs, map, 1946. 22 refs.
DLC, AS262.A62465, 1946

The hydrological regime of the ÎAna and Indigirka river basins which cause larger floods in summer than in spring is described. The snow melt run-off of the majority of rivers in the subarctic and the more southerly permafrost regions amounts to 50-75% and rain run-off is 15-35%. The snow melt run-off of the ÎAna and Indigirka rivers is only 15-35% and rain run-off 50-70%. This anomaly is explained by large subpermafrost water stores which produce gigantic naleds. The total volume of ice in these icings reaches several hundred million cu. m.

SIP U6168

FRANZ JOSEPH LAND. (Zemlia Franîsa Iosifa; Text in Russian). p.97-138 incl. illus. table, map, 11 refs. (In: Ostrova Sovetskoĭ Arktiki by V. K. Esipov and N. V. Pinegin. Arkhangel'sk, 1933)
DLC, G790.E8, 1933

A brief history of investigations since the discovery of the archipelago and physiographic features are given. The records of V. ÎU. Vize covering the period 1880-1928 indicate that the ice extends southward along 50°E. long. an average distance of 370 naut. mi. in June, 350 naut. mi. in July and 160 naut. mi. in Aug. These values varied widely from year to year, being higher from 1909-1919 and lower after 1920. The average annual air temperature was -14.3°C with monthly means above the f.p. occurring in July (+ 1.4°C) and in Aug. (+ 0.8°C), and extremes in July (+ 12.2°C) and Jan. (-46.7°C). Annual precipitation ranged from 300-500 mm. mostly in the form of snow. Permafrost with the active layer at a 40-cm. depth occurs throughout most of the area. About 87% of the archipelago is covered with glaciers.

SIP U6169

Church, J. E., Jr.
HIGH DENSITY OF SNOW ACCELERATES ITS MELTING AND RUN-OFF. Eng. News-Record, 99:553, Oct. 6, 1927.
DLC, TA1.E6, v. 99

Records of snow density, temperature, level and run-off from 1909-1916 show that high densities accelerate melting. Deficient density appeared to cause retardation in run-off. The acceleration is attributed to the inability of hard snow to hold meltwater in suspension. The density at which snow ripens depends upon the conditions under which it is deposited. Snow increases in density mainly by

gravity and temperature at lower levels, sheltered from wind. The normal rate of evaporation from snow is low, as well as the rate of melting at the surface of soft and dense snow, because all snow must ripen before run-off occurs.

SIP U6170

ICE THRUST AGAINST DAMS. Eng. News-Record, 99:742-743, Nov. 10, 1927.
DLC, TA1.E6, v. 99

Ice thrust may develop from 2 causes: expansion of ice in process of formation within a confined area, and the thrust of a thick sheet of ice as it expands due to temperature increases within a range below the f.p. The temperature-expansion thrust may be a serious menace, especially to small dams. An ice sheet 1 mi. long will increase in length approximately 1.5 ft. for each 10°-rise in temperature. Compressed air released under water so that a row of air bubbles continually rises to the surface along the line where the open water is desired, is a method of relieving the expansion danger. Investigations in Norway showed that the maximum thrust from temperature ranges in that country will not exceed 6 tons/linear ft. for a 30-in. ice sheet.

SIP U6171

Ryan, R. R.
TEST METHOD FOR SNOW WEIGHTS. Eng. News-Record, 99:1014, Dec. 22, 1927.
DLC, TA1.E6, v. 99

A maximum snow load was determined near Sault Ste. Marie (Mich.) using a carpenter's square, fire shovel, hand-sleigh, wash boiler and yardstick. One hundred measurements at about equal intervals along the circumference of a circle were made by forcing the yardstick vertically through the snow, on a level area free from effects of wind, trees, fences, and buildings. The average of the readings was about 22 in. A vertical snow prism of 1 sq. ft. horizontal section, squared 3 ways, was cut, lowered into the wash boiler, taken to a grocer's scale, where it weighed 32 lb. net. It is recommended that roofs in this area be designed for this 32-lb. minimum snow load per sq. ft. of horizontal surface.

SIP U6172

Souter, Robert K. and Joseph B. Emerson
SUMMARY OF AVAILABLE HAIL LITERATURE AND THE EFFECT OF HAIL ON AIRCRAFT IN FLIGHT. NACA Tech. Note No. 2734, 162p. incl. illus. tables, graphs, maps, Sept. 1952.
DLC, TL521.A35, No. 2734

Available information on the hail phenomenon affecting aircraft in flight was examined. An attempt is made to coordinate present knowledge of hail with the effect of hail on aircraft in flight. Included are a digest of the literature on the physical properties, occurrence, and formation of hail, a survey of the hail effect on aircraft in flight from analyses of 51 cases of airplanes damaged by hail, a summary of hail information for the benefit of pilots, forecasters, and ground operational personnel, and an annotated hail bibliography of 596 articles. (Authors' abstract)

SIP U6173

Comissot, N. A.
THE pH OF THE RAIN AT BEIRUT AND OF THE SNOW ON THE MOUNTAINS OF LEBANON. Bull. Am. Meteorological Soc. 32:24-26 incl. tables, Jan. 1951. 1 ref.
DLC, QC851.A6, v. 32

Electrometrical measurements of the pH of rain and snow were made from 1937-1939. The frequency distribution and mean values of pH are tabulated for Oct.-April. Snow samples were taken at elevations varying from 1200-1600 m. and in places where the minimum snow depth was 1 m. The snow was found more acid than the rain of the corresponding months with mean pH values ranging from 3.84-5.44.

SIP U6174

Ito, K.
A NEW TYPE SNOW GAUGE (SECOND REPORT). (Shisaku jiki setsuryo-kei ni tsuite [dai 2 ho]; Text in Japanese with English summary). J. Meteorological Res. 5:95-98 incl. graph, diagrs. March 1953.
DWB, Unbound periodical

A new type of snow gage was designed to eliminate problems of friction, adjustment, etc. of the Hellmann's recording snow gage. Improvements made in the original gage are described.

SIP U6175

Buehrer, T. F. and M. S. Rose
BOUND WATER IN NORMAL AND PUDDLED SOILS. Experiment Station. Univ. Ariz. Tech. Bull. No. 100:154-218 incl. illus. tables, graphs, June 20, 1943. 50 refs.
DLC, S35.E2, No. 100

The effect of puddling on the amount of water bound by typical arid and humid soils under a variety of conditions is studied. The effect of puddling upon the f.p. depression of several different soils was measured over a range of moisture content above and below the moisture equivalent. Puddling increases the lowering over that of the normal soil. The effect of alternate freezing and thawing on the f.p. depression of puddled soils shows that freezing restores the original structure in organic soils but does not restore low organic soils to the aggregated structural condition. Puddling increases the f.p. depression by an amount inversely proportional to the structural stability of the soil. A new dilatometer is described and its calibration with fundamental variables determined for reliability and reproducibility. Calibration with respect to water expansion upon freezing shows that the volume of pure water when frozen expands by 9.21%

SIP U6176

Sverdrup, Harald U.
ARCTIC SEA ICE. 22p. incl. tables, graph. (In: Encyclopedia Arctica, vol. 7, pt. 7, [n.d.] 7 refs.
DWB, M82.2/98 E56, Pts. 7-9

Sea ice is formed by the freezing of sea water. The density of sea water at salinity greater than 2.47‰ increases until the f.p. is reached and the whole body of water must be cooled to the f.p. before ice can form on the surface. Sea water freezes to pure ice containing small cavities filled by brine. The salt in the brine crystallizes out at -23°C. The temperature of ice in contact with sea water equals the f.p. corresponding to the salinity of the water. The underside of an ice floe remains at constant temperature during the whole year, while the temperature of the surface varies. The salinity of the ice varies from 0-1.5‰ and depends mainly upon rapidity of freezing and temperature changes after freezing. Trapped brine moves slowly down and produces a freshening of the top layers which produce potable water upon melting, the upper 50 cm. of ice having a temperature of 0°C in Aug. Winter ice freezes to a thickness of 150-250 cm. and melts by absorption of radiation in spring which reduces its thickness by an average of 100 cm. each summer. The physical properties of sea ice depend upon its salt content and the amount of air bubbles in the ice. The transformations and seasonal changes of sea ice are discussed.

SIP U6177

Hare, F. Kenneth
THE CLIMATE OF THE AMERICAN NORTHLANDS. 56p. tables, maps. (In: Encyclopedia Arctica, vol. 7, pt. 3, [n.d.]) [32] refs.
DWB, M82.2/98 E56, Pt. 3

The dynamic climatology of the American Arctic and the temperature regime are discussed. Notes on precipitation, humidity, and cloudiness are presented. The deficiency of arctic precipitation is due to the low moisture capacity of cold air masses. Snowfall exceeds 100 in./yr. in all exposed localities of the Pacific northwest, and exceeds 250 in./yr. on exposed slopes at elevations of 3000-4000 ft. Winter snowfall amounts to 100 in./yr. in Labrador, southeastern Baffin Bay, and southwestern Greenland. Blowing snow is nearly always present with winds in excess of 15 m.p.h. and is a hindrance to air and land communications.

SIP U6178

Sverdrup, H. U.
OCEANOGRAPHY OF THE ARCTIC. 61p. map. (In: Encyclopedia Arctica, vol. 7, pt. 6, [n.d.]) 45 refs.
DWB, M82.2/98 E56, Pt. 6

The limits, bathymetric features, bottom sediments, salinity, temperature, oxygen content, currents, formation of deep and bottom water, and the ice conditions of the arctic seas are presented. Wind drift of the ice in the eastern Siberian Sea is discussed. The water on the shallow areas between Laptev Strait and Bear Island freezes to the bottom in winter; the ice floes rise when melting takes place in summer and carry with them mud, stones and shells.

SIP U6179

Rae, R. W.
CANADIAN METEOROLOGY. 98p. incl. tables, maps. (In: Encyclopedia Arctica, vol. 7, pt. 2, [n.d.]) 38 refs.
DWB, M82.2/98 E 56, Pt. 2

The history of the Canadian Weather Service and the Canadian arctic and subarctic weather stations is presented. The arctic expeditions in which the Canadian Meteorological Service participated and the arctic observing techniques are described. The climate of arctic and subarctic Canada is discussed. Snowfall in the arctic is relatively light during winter, the air temperature being low makes precipitable water vapor small. The depth of the snow is seldom over 12 in. Snow particles are small and are carried aloft when the wind speed reaches 15 m.p.h. The visibility is reduced to near zero by blowing snow at wind speeds over 40 m.p.h. Snowdrifting renders snowfall measurements difficult. Drifting snow is hardly distinguishable from a new snowfall, though newly fallen snow is usually whiter than old drifting snow. Sea ice begins to form in the sheltered bays of the Northern Islands in mid-Sept. and the open sea freezes over in Oct. New ice increases at a constant rate of 1 ft./month from Nov.-March and reaches a maximum thickness of 7 ft. in early June.

SIP U6180

Petterssen, Sverre, W. C. Jacobs and B. C. Haynes
THE METEOROLOGY OF THE ARCTIC REGION. 308p. incl. tables. (In: Encyclopedia Arctica, vol. 7, pt. 1, [a-d]) 56 refs.
DWB, M82.2/98 E56, Pt. 1 (a-d)

The polar climate comprises the frost climate occupying regions of perpetual snow and ice, and the tundra climate characterized by bare ground during the warm season. Acoustical and optical phenomena, air masses and fronts, cyclones, atmospheric pressure, winds, temperature, precipitation, humidity, cloudiness and ceilings, fog and visibility, and sunshine and illumination are discussed. Difficulties in snow measurements are caused by drifting of dry arctic snow into, and blowing of newly fallen snow out off the recording gages. Precipitation over most of the arctic is very light and amounts to less than 10 in. in the polar basin and 4 in. in the Siberian-American portion of the Arctic Ocean and the northern part of the Canadian Archipelago. Conditions over the Greenland Ice Cap are particularly favorable for hoarfrost formation. Glaze occurs most frequently in spring and autumn except in the far north where it is most frequent in summer. The water equivalent of arctic snow is often 0.50 and

averages 0.30-0.45. Snow depths reach a maximum in the dry continental part in Feb., and in the maritime regions in May. The snow cover disappears in summer everywhere except at elevations above the permanent snow line.

SIP U6181

Stefansson, Vilhjalmur
THE USES OF ICE. 127p. (In: Encyclopedia Arctica, vol. 7, pts. 10a-b, [n.d.])
DWB, M82.2/98 E56, Pts. 10 (a-b)

The aviation uses of lake and river ice, salt-water ice, and inland ice north of 60°N. lat. are discussed. Lake and river ice are usable for airplane descents and take-offs 6-8 months of the year except in Iceland, in parts of the southern coast of Alaska, and portions of Scandinavia. The availability of coastal salt-water ice ranges from zero in southern Alaska, around Iceland and the northern shores of Scandinavia to a maximum of 10 months around Peary Land and Severnaya Zemlya. Salt-water drift ice is not usable for airfields. The arctic pack is usable for 7-8 months near the outer edge and for 9-10 near the center. Glacier ice usable all year is used mainly in summer when river, lake, or coastal sea ice are not available. Permanent snowdrifts are scarce though some exist on Melville Island (Canada) and in northern Siberia. The building and maintenance of airplane landing fields on the Greenland Ice Cap are discussed. The use of northern rivers and lakes as winter roads for tractor-trains and animal-drawn sledges is assessed. The use of ice for sledge shoeing, ice planks, ice depots and igloos is mentioned.

SIP U6182

Wade, F. Alton
GREENLAND INLAND ICE WEATHER STATIONS. 12p. illus. (In: Encyclopedia Arctica, vol. 7, pt. 11, [n.d.])
DWB, M82.2/98 E56, Pts. 11-13

Attempts made to establish inland ice stations to supplement coastal stations are presented. A German expedition established an icecap station, Eismitte, near the geographic center of Greenland where weather records were kept for 1 yr. A British expedition established a station 270 mi. south of Eismitte the same year. Both stations were abandoned due to hardships. The U. S. Army Air Forces Ice Cap Detachment established inland bases in 1943-44. A not-too-difficult trail through the marginal zone was found and used sucessfully. New types of over-snow mechanized vehicles can transport the great quantities of equipment and supplies from coast to station sites on the inland ice. Such transportation makes possible the erection of heavy, adequate and comfortable buildings anywhere on the icecap and the installation of practical inland ice stations.

SIP U6183

Weaver, John C.
THE ICE OF THE SEAS IN THE NORTH AMERICAN ARCTIC. 53p. (In: Encyclopedia Arctica, vol. 7, pt. 12, [n.d.]) 5 refs.
DWB, M82.2/98 E56, Pts. 11-13

Fast ice, drift ice, and arctic or polar pack ice are the 3 major ice types of the northern seas. The polar pack occupies 70% or 2,000,000 sq. mi. of the north polar basin and varies in thickness from 7-100 ft. Fields and floes break loose from the central polar ice mass in the slow revolution of ice about the pole, and are discharged southward to the North Atlantic along the eastern coast of Greenland and the northeastern coast of North America. The eastern Greenland pack discharges 3000-4300 cu. mi. of ice/yr. and is characterized by storis. The northeastern North American pack travels at an average speed of 12.5 mi./day, 30% is of arctic ice origin, 60% originates in Baffin Bay and Davis Strait where about 7500 icebergs are produced annually. The movements of this pack and its threat to navigation are discussed. Ice conditions of the Hudson Bay and Strait, the Northwest Passages and the Arctic Seas of Alaska are discussed. The Alaskan waters north and east of Bering Strait are dominated by the movements of the polar pack; heavy fast ice covers the bays and fringes the shores of northern Alaska for 10 or more months per yr. Icebergs do not menace navigation along the western margin of the continent.

SIP U6184

Eon, L. G.
AN ANALYSIS OF RADAR ECHOES FROM SNOW. CAORG Rept. No. 45, 54p. incl. illus. tables, graphs, map, diagrs. May 15, 1946. 1 ref.
DWB, M01.81 C212r, No. 45

Research carried out using radar at centimetric wave lengths to analyze weather echoes from snow is reported. Signal-to-noise measurements were made using radar operating on the S and X bands. Snow intensity, density, flake size, and visibility were measured by ground observers located below the radar beam. The information so obtained correlated with the signal-to-noise measurements. A good correlation was noted for visibility and intensity. Radar in its present form can give up to 0.5-hr. warning of the approach of snow causing low visibility, the duration of which can usually be forecast. The intensity and visibility during the snowstorm can be estimated before the storm arises. The intensity and depth of snow that will occur can be forecast for short periods. The accumulation of snow in inaccessible places can be estimated from radar observations. Measurements were made at ranges of 5 and 8 mi. and the results extrapolated to give maximum ranges at which various intensities of snowfall should be seen. (Author's abstract)

SIP U6185

Amer. Inst. Aerological Res.
A BIBLIOGRAPHY ON WEATHER MODIFICATION AND FIELD OPERATIONS. [13]p. March 25, 1953. DWB, M09.67A512b

The title and number of the reports, the organization for which the report was made, and the date of issue are given. Nine reports were issued by Irving P. Krick, Meteorological Consultant, 59 by the American Institute of Aerological Research, and 36 by the Water Resources Development Corporation. Dates vary from Dec. 1947 to Jan. 1953.

SIP U6186

von Gaertner
ICE CONDITIONS IN THE SOUTHERN GULF OF BOTHNIA. (Eisfreiheit im südl. Bottnischen Meerbusen; Text in German). Wehrgeologenstelle 27, No. 46/42, 1p. maps, April 1, 1942. (typed ms.)
DWB, File No. 3311

The dates of ice breakup of solid ice covers are plotted. Extreme dates of breakup are indicated. It can be assumed that the ports may be entered about 5-10 days earlier with the aid of ice breakers.

SIP U6187

Al'tberg, V. Ĥ.
NEW DATA ON THE NATURE OF ANCHOR ICE. (Novoe o prirode donnogo l'da; Text in Russian with German summary). Izvestiĥa Rossiiskogo Gidrologicheskogo Instituta, No. 1:40-67 incl. illus. diagrs. 1921. 21 refs.
DLC, GB651.L4, 1921

The basic theories on anchor ice formation are reviewed and analyzed. The conditions necessary for anchor ice formation were determined through laboratory experiments. The important contributing factors are movement and supercooling of water, and sluggishness of water in the immediate area of protruding objects. Thin plates and needle ice, rather than hexagonal crystals, form in rapidly flowing, supercooled water. These ice forms serve as nuclei for the formation of anchor and frazil ice. An ice cover is a factor preventing anchor ice formation. Holes cut into an ice cover encourage massive anchor ice formation. The protection of city water supply from the damaging effects of anchor ice is discussed.

SIP U6188

Hausmann, Gisela
UNPERIODICAL VARIATIONS OF SOIL TEMPERATURES AT DEPTHS OF 1 TO 12 M. (Unperiodische Schwankungen der Erdbodentemperaturen in 1 m. bis 12 m. Tiefe; Text in German). Z. Meteorologie, 4:363-372 incl. tables, graphs, Dec. 1950. 8 refs.
DLC, QC851.Z4, v. 4

Soil temperatures at Potsdam (Germany) and their relation to climatic influences and variations were investigated using data for the period 1894-1949. Temperatures at 1, 2, 4, 6, and 12-m. depths were measured by Hg thermometers attached to the lower end of a wooden rod, which is inserted into a protective tube of German silver. The experimental plot was kept snow-free during winter. Mean annual extremes, dates and phase lags, recorded extremes and monthly means are tabulated and discussed. The irregularities in the daily mean curves at 1 and 2 m. are plotted and related to singularities. Frost penetration and duration at 0.5 and 1 m., which occurred in 8 yr., and extreme minima are tabulated and discussed.

SIP U6189

Kudrĥavt͡sev, M. N.
ROADBED PLANNING UNDER PERMAFROST CONDITIONS. (Proektirovanie dorozhnogo polotna v usloviĥakh vechnoĭ merzloty; Text in Russian). p.53-57 incl. diagrs. (In: Zemliĥnoe polotno avtomobil'nykh dorog, by M. N. Kudrĥavt͡sev, Moscow, Dorizdat, 1943)
DLC, TE145.K8, 1943

Changes in the superpermafrost ground-water regime can adversely affect road bed construction. Removal of the vegetative cover will lower the permafrost table, thereby inducing an accumulation of ground water and subsequent heaving. Fills and cuts will raise the permafrost table and cause landslides. Icings are formed largely through seepage of superpermafrost ground water. Recommendations for roadbed construction include the selection of a route along southern slopes through dry, coarse ground, preferably bedrock and the avoidance of cuts and areas subject to icings and containing buried ice. The permafrost table can be stabilized if fills are between 1-2 m. high containing no more than 30-50% silt. Fills over 2 m. should be composed of good drainage material within 1 m. of the surface. Construction of cuts and applications of frozen belts are described.

SIP U6190

Lugovskiĭ, M. V.
OPERATION OF HYDROTECHNICAL CONSTRUCTIONS OF RURAL HYDROELECTRIC STATIONS. (Ekspluatat͡siĥa gidrotekhnicheskikh sooruzheniĭ sel'skikh gidroelektrostant͡siĭ; Text in Russian). Moscow, Sel'khozgiz, 1950, 168p. incl. tables, diagrs. 21 refs.
DLC, TK1081.L76, 1950

The operations of rural hydroelectric power stations located on ice-covered rivers are described. Frazil ice is classified according to coverage into sparce, medium and continuous ice covering a quarter, a half and over half of the water surface respectively. Floating racks are devices used for speeding ice-cover formation and diminishing frazil-ice formation. Emergency crowbars, shovels, axes and dredges are available in winter and the ground around the dams and wooden constructions is in-

spected for fissures and insulation. Deformation around dams and wooden structures is prevented by growing underbrush, piling snow over the dams, using tree branches and straw for insulation and placing a hut over the racks. Wooden beams are frozen into the ice cover as a control measure. Methods of transferring frazil ice to a channel are described. Spring breakup is facilitated and ice jams are demolished by means of explosives.

SIP U6191

Hogentogler, C. A.
FROST PHENOMENA. p.127-158 incl. illus. tables, graphs, diagrs. (In: Engineering Properties of Soil, by C. A. Hogentogler, N. Y. and London, McGraw-Hill Book Co., Inc. 1937)
DLC, TA710.H56

Heat transfer, insulating properties of materials, and the effect of air temperature are discussed. The freezing process is analyzed in terms of the direction of growth of ice, ice lenses responsible for heave, freezing of supercooled water, heave in permeable soils and soils with high capillarity, and moisture requirements for frost heave. The effects of types of soil coverings, soil character, climatic changes, and soil profile are analyzed. Results of controlled heaving experiments are presented.

SIP U6192

Germany. Oberkommando des Heeres
THE CLIMATIC CONDITIONS OF THE EUROPEAN PART OF RUSSIA. SUPPLEMENT. ICE BREAKUP AND SPRING FLOODS. (Die klimatischen Verhältnisse des europäischen Teiles von Russland. Nachtrag. Eisaufbruch und Hochwasser im Frühjahr; Text in German). 20p. incl. tables, maps, Feb. 1942.
DWB, File No. 2744

Data from observation stations along the rivers show that the time of ice breakup and the swelling of the rivers varies greatly within the individual years. The most frequent beginning periods of breakup and drift are tabulated for various localities along the different rivers, and the earliest and latest dates of breakup are indicated. Water levels, duration and extent of floods, and ice and water conditions of the Ladoga and Onega lakes are discussed.

SIP U6193

Germany. Reichsamt für Wetterdienst (Luftwaffe). Klima-Institut Minsk
THE DRAINAGE AREAS IN THE CENTRAL SECTOR OF THE EASTERN FRONT. No. 1: DRAINAGE AREA OF THE PRIPYAT. (Die Stromgebiete im Mittelabschnitt der Ostfront. Heft 1: Stromgebiet des Pripjet; Text in German). Minsk, 49p. incl. tables, Dec. 1943.
DWB, File No. 2744

The physical and geographical features of the Pripyat drainage basin are described. The various soil types are defined including the podzolic soils and their transitional forms. The formation, extent, and icing of bogs are discussed. Icing thickness of bogs is a function of the water conditions, composition and distribution of the plant cover, and above all the snow cover. Frost penetrates rapidly in dry bog in the absence of a protective snow cover. An ice cover formed over the bog surface after flooding acts as an insulator in preventing deep frost penetration. The thawing processes of bogs are analyzed and equations are given for determining the depth of thawed soil. The climatic conditions including temperatures, precipitation, snow cover, and fog, and hydrological conditions including dates of icing and run-off are tabulated.

SIP U6194

[ICE CROSSINGS]. 18 diagrs. with German text, [1943].
DWB, File No. 2744

A series of 18 diagrams are presented depicting the structure of an ice cover, various types of ice-thickness meters and measuring methods, methods for reinforcing an ice cover for carrying various loads including structural details, types of shore connections with an ice cover, and sleds for transporting heavy loads.

SIP U6195

Germany. Deutsche Seewarte
ICE BREAKUP IN EASTERN EUROPE. (Der Eisaufbruch in Osteuropa; Text in German). 5p. incl. tables, 1941. (typed ms.)
DWB, File No. 2744

Only a short period, often only a few days, elapses from the time of ice breakup to complete absence of ice in northern and eastern Russia. First the snow melts, the meltwater collects in the rivers and lakes, which in turn rise and loosen the ice cover from the shore. Further breakup on lakes is caused by wind action, and by stream flow on the rivers. The individual floes melt more rapidly in the rivers than in the lakes, which heat slowly because of their greater body of water. Earliest, mean, and latest dates of breakup for various rivers are tabulated. The breakup of the larger rivers occurs before that of all other waters, immediately after the onset of an average diurnal temperature of 0°C. The smaller rivers and streams follow at an interval of 1-3 weeks, then the canals, and finally the lakes. The location of drift ice concentrations are indicated. The appearance and disappearance of the earliest and latest ice at various points of the White Sea are tabulated.

SIP U6196

Germany. Reichsamt für Wetterdienst (Luftwaffe). Klimainstitut Minsk
FALL FLOODS, ICE DRIFT AND ICING OF THE RIVERS IN THE CENTRAL SECTOR OF THE EASTERN FRONT. (Herbsthochwasser, Eisgang u. Vereisung der Flüsse im Mittelabschnitt der Ostfront; Text in German). 19p. incl. tables, graphs, maps, Aug. 1943.
DWB, File No. 2744

Daily water levels during fall and early winter for the rivers of the central sector are graphed. The rivers, of which the Dnepr is the most significant, all show common tendencies. Most of the fall floods occur in Nov. and are much less severe than the spring floods. Dates of earliest, mean, and latest fall ice drifts and icing are plotted on the basis of a 50-yr. observation series. Minimum and maximum ice thicknesses on Jan. 1, Feb. 1, and March 1, from an 8-yr. observation series, are plotted. The average duration of the fall ice drift is 12-14 days. The mean date of icing is near the end of Nov. and beginning of Dec. and lasts 105-125 days. The ice thickness is usually 40-45 cm. by the end of Feb. and beginning of March, 30 cm. during mild winters, and 60-70 cm. in cold winters.

SIP U6197

Voigt
DATA CONCERNING THE ICING OF THE BARTA RIVER. (Angaben über die Vereisung der Barta; Text in German). Wehrgeologenstelle (21) beim AOK 18, Az 39, Geol. 10g Nr. 1504/44, 2p. graph, Nov. 18, 1944. (typed ms.)
DWB, File No. 2744

Information on the beginning, duration, and end of the ice cover on the Barta River (Latvia) is presented. The dates of icing from 1931-1940 are graphed. The earliest ice cover formed Nov. 20, and the average date of formation is during mid-Dec. Temporary interruptions of the ice cover during mid-winter occur frequently. The mean date of breakup is mid-March. Greatest ice thicknesses were measured at the beginning of March at the end of a long frost period.

SIP U6198

Al'tberg, V. Â.
WHY CONSIDER AN ANTIQUATED VIEWPOINT ON ANCHOR ICE FORMATION? (Est' li osnovaniâ dlâ vozvrata v voprose o donnom l'de na pozitsiâ 30-ykh godov proshlogo stoletiâ? Text in Russian with French summary). Zapiski Gosudarstvennogo Gidrologicheskogo Instituta, 7:23-32 incl. tables, graphs, 1932. 9 refs.
DLC, GB651.L42, v. 7

The theory explaining anchor-ice formation as resulting from heat loss of the water to the stream bottom and banks is criticized. The temperature amplitude in the soil decreases with depth. Annual temperature variations penetrate no more than 20-30 m. even in severe Siberian climate. The temperature amplitudes at various depths are shown for each month and type of soil in Irkutsk. Anchor-ice formation at great distances from riverbanks cannot be explained on the basis of heat loss to the soil. Little cold penetration would be obtained if the temperature fluctuations were decreasing in water in the same way as in the soil. Makkaveev's theory of turbulent motion has greater validity. The temperature of the stream bottom is always higher than 0°C when anchor ice is formed.

SIP U6199

Petrovskiĭ, A. A.
THEORETICAL BASIS FOR MEASURING SPECIFIC RESISTANCE OF FROZEN AND THAWED GROUND BY MEANS OF THE TWO-POINT SET OF A CONSTANT FLOW. (Teoreticheskie obosnovaniâ izmereniĭ udelnogo soprotivleniâ merzlykh i talykh gruntov pri pomoshchi dvukhtochechnoĭ ustanovki postoânnogo toka; Text in Russian with English summary). Izvestiâ Akademii Nauk SSSR, Otdelenie tekhnicheskikh nauk, No. 3:363-402 incl. tables, graphs, diagrs. 1937. 2 refs.
DLC, AS262.A6244, 1937

The specific (electric) resistance of frozen and thawed ground was measured using soil samples in parallelepipedal or cylindrical form. The method employs a 2-point setting and the results are not affected by deformation of the sample or changes in the transient resistance of the contacts. The accuracy of the method is determined with a galvanometer. Formulas were developed based on the assumption of a rectangular parallelepipedal form of samples filled with a homogeneous, isotropic medium surrounded by an ideal dielectric. The problem was reduced to the solution of a system of differential equations with partial derivatives at the given boundary conditions. The potential due to the effect of one electrode is expressed by a final formula which represents the combined effect of 4 infinite rows of layers distributed according to a definite law. Instructions for practical application of these formulas are included.

SIP U6200

Finkel'shteĭn, Â. B. and D. P. Mal'kovskiĭ
MECHANIZATION OF GROUND OPERATIONS IN WINTER. (Mekhanizatsiâ zemlânykh rabot v zimnee vremâ; Text in Russian). p.59-72 incl. illus. table, diagrs. (In: Ottaivanie merzlykh gruntov dlâ prokladki podzemnykh kommunikatsiĭ, by Â. B. Finkel'shteĭn and D. P. Mal'kovskiĭ, Moscow-Leningrad, Gosudarstvennoe Izd-vo Lit-ry po Stroitel'stvu i Arkhitekture, 1952)
DLC, TA713.F55, 1952

Holes, 50 and 75 mm. in diam., are drilled in frozen ground to accommodate electrical and water needles. These holes are drilled with mobile machines of about 3.5-kw. capacity with vertically or horizontally placed electric motors of 1450 r.p.m.

equipped with a reduction gear. The machine drills at a rate of 1.3 mm./sec. and raises the boring bit at 8 mm./sec. A plow for removing cobblestone pavements and for various winter excavating operations as well as other special equipment for winter excavations are described.

SIP U6201

Woods Hole Oceanographic Institution
RESEARCH IN RELATIONS BETWEEN THE NORTH ATLANTIC SEA ICE AND ARCTIC WEATHER CONDUCTED DURING THE PERIOD FEBRUARY 15 TO MAY 15, 1950. Periodic Status Rept. Ref. No. 50-23, 4p. tables, June 1950. (Contract N6onr-27705)
DN-HO, GB2401WHOI50-23

The temperature deviation at Archangel (USSR) following either a severe or light ice decade appears usually greater in the decade after, rather than in the decade contemporary with the ice extreme decade. The temperature deviation is greater during, rather than in the decade following the ice extreme decade at Stykkisholm (Iceland) where the persistance effect appears to depend on the preceding ice in its own area solely. No consistent relation was indicated between the ice off Iceland and the preceding temperature of Iceland, Archangel, Vardo, and other stations. The departure from the normal in iceberg severity in 1950 off Newfoundland was computed and a severity above average predicted.

SIP U6202

Bauer, Edmond and Michel Magat
DEFORMATION OF MOLECULES IN THE CONDENSED PHASE AND THE H-BOND. (Sur la déformation des molécules en phase condensée et la "liaison hydrogène"; Text in French). J. phys. radium, 9:319-330 incl. tables, graphs, diagrs. Aug. 1938. [38] refs.
DLC, QC1.J8, v. 9

The experimental facts of Raman effect and infrared spectra absorption dealing with the effects of temperature on the OH-bond in water-ice, alcohols, and solutions are summarized. Electrostatic perturbations of molecules by their neighbors permit the qualitative and in some cases the quantitative explanation of the behavior of the OH-group in different states of matter. The hypothesis of the homo-polar H-bond is considered unnecessary to explain the frequency variation observed in ice and water. The concept of a polar union affords a better explanation of the frequency variations of the OH-radical as a function of temperature and physical state. The proton bond between neighboring molecules in H_2O and alcohol is almost 100% polar.

SIP U6203

Brooks, Charles Franklin
THE SNOWFALL OF THE EASTERN UNITED STATES. Monthly Weather Rev. (U. S.), 43:2-11 incl. tables, graphs, maps, Jan. 1915. 17 refs.
DLC, QC983.A2, v. 43

The average distribution of snow in the eastern U. S. is similar to that produced by a single cyclone. The Lake Region, Appalachians, and N. Atlantic Coast exposed to low temperatures and moist winds get the heaviest snowfall. The Ohio Valley, S. Atlantic and Gulf States are too warm for much snow and winters are too dry in the northwest to produce any but moderate snow flurries. Snowfall is locally modified by topography and the exposure to moist winds within the larger snowfall provinces. Snows are heavier on the western than on the eastern slopes of the Appalachians and on the eastern than on the western shores of the Great Lakes.

SIP U6204

Jaenicke, Alexander J. and Max H. Foerster
THE INFLUENCE OF A WESTERN YELLOW PINE FOREST ON THE ACCUMULATION AND MELTING OF SNOW. Monthly Weather Rev. (U. S.), 43:115-126 incl. illus. tables, March 1915. 6 refs.
DLC, QC983.A2, v. 43

The accumulation and melting of snow was studied at Fort Valley Exp. Sta. (Ariz.) in a naturally treeless area and in a virgin western yellow pine forest area during 1910-11 and 1912-13. Total snowfall and density are the same in both areas. The snow lies in an even layer in the park, and in shallow layers and deep drifts in the forest. Rate of melting is greater in winter and slower in spring in the forest than in the park. The park snow water contributes to surface run-off and floods, the forest snow water to seepage. Adverse critical remarks are appended.

SIP U6205

Palmer, Andrew H.
THE REGION OF GREATEST SNOWFALL IN THE UNITED STATES. Monthly Weather Rev. (U. S.), 43:217-221 incl. illus. tables, diagr. May 1915. 1 ref.
DLC, QC983.A2, v. 43

The region of greatest snowfall in the U. S. lies in the Sierra Nevada of Calif. between Sacramento (Calif.) and Reno (Nev.) where more than 100 in. of snow falls every winter with a maximum of 783 in. recorded at Summit (Calif.) in 1879-80. The methods of measuring snow are discussed. Winds accompanying snowstorms at these elevated stations are relatively light and the snow falls in straight lines. The pressure of deep snow on a submerged object is larger than that of the vertical section of snow directly above it due to the effect of repeated freezing and thawing. A discussion of the methods of determining the water content of snow by A. J. Henry and G. H. Wilson is appended.

SIP U6206

Dadykin, V. P.
BIOLOGICAL PECULIARITIES OF VEGETATION IN COLD SOIL. (O biologicheskikh osobennostiakh rastenii kholodnykh pochv; Text in Russian). Priroda, 39, No. 5:21-29 incl. illus. tables, 1950. 2 refs.
DLC, Q4.P8, v. 39

Three types of plants growing in permafrost regions are differentiated according to soil penetration of the root systems. Field experiments in permafrost were made at 67°27' N. lat. with several wild and cultivated plants. The active layer measured 2-3 m. The temperatures in the higher soil horizons were -0.5° to -0.8°C, seldom lower than -1.5°C. Roots of cloudberry, sedge and horsetail were found to penetrate into the frozen ground to a depth of 90 cm. and remain viable. These tests tend to indicate that various plants in permafrost regions utilized different ways of adaptation to low soil temperatures. The results of root penetration of oats and potatoes in frozen ground and harvest yields are tabulated. Tests showed that the value of transpiration decreased under low temperatures and the osmosis increased. Results of similar laboratory studies are given.

SIP U6207

Beskow, Gunnar
THE SIGNIFICANCE OF GROUND FROST FOR ROAD SURFACING. (Tjälens betydelse för vägbeläggningar; Text in Swedish). Svenska Väginst. Medd. No. 41:1-33 incl. illus. tables, graphs, diagrs. 1933. 24 refs.
DPR, TE4650.S8A3, No. 41

The mechanical and hydrodynamic properties of soil types are discussed in relation to ground frost activity. The influence of size of soil particles on the stability of the soil is considered. Frost heaves are analyzed in terms of a pushing action exerted on the soil particle by the expanding ice crystal which permits more water molecules to slip between the ice crystal and the surface of the soil particles. Methods and countermeasures against the dual damages of heaving and/or softening of road surfaces include deep drainage and shallow ditches.

SIP U6208

Arnfelt, Harry
DAMAGE ON CONCRETE PAVEMENTS BY WINTERTIME SALT TREATMENT. (Skador på betongvägar uppkomna genom saltbehandling vintertid; Text in Swedish with English summary). Svenska Väginst. Medd. No. 66:3-24 incl. illus. tables, graphs, 1943. 6 refs.
DPR, TE4650.S8A3, No. 66

$CaCl_2$ spread on the highway between Linköping and Norrköping during the winter 1940-41 caused the concrete surface to chip. Specimens taken from this road and from one not treated with salt were exposed to a cycle of freezing (-25°C) and thawing (+20°C). A 3.5% $CaCl_2$ solution had the most damaging effect on the concrete samples; weaker as well as stronger solutions were far less detrimental. Relatively dilute solutions have the maximum effect indicating that ice crystallization, rather than the salt, is the cause of the damage. Experiments simulating snowchains hitting the frozen concrete gave evidence of increased damage. There is no satisfactory explanation as to why tiles and sandstone materials are damaged more by distilled water than by salt solutions. It is possible that the different capillarity is a factor.

SIP U6209

Beskow, Gunnar
FUNDAMENTALS OF THE GROUND FROST PROBLEMS. SUMMARIZATION OF THE MOST SIGNIFICANT RESULTS OF INVESTIGATIONS IN PROCESS. (Tjälproblemets grundfrågor. Sammanfattning av de viktigaste resultaten av pågående undersökningar; Text in Swedish). Svenska Väginst. Medd. No. 13:3-16 incl. illus. diagrs. 1929. 6 refs.
DPR, TE4650.S8A3, No. 13

The water present in soil during freezing causes but insignificant heaving. Massive heaving is caused by water rising from below during the freezing process. This capillary water supply requires unbroken connection with a free ground-water level. The capillary power is activated through the dessicated zone in the soil that resulted from condensation. A formula for this function is presented. Heavy precipitation causes a high ground-water level and consequent large ice accumulation. Less precipitation, frost, and snow removal close to the ground favors quick freezing and consequent little ice accumulation in the upper layers of the road, which tends for stability during the spring thaw. However, the frost depth increases until it approaches the ground water level. The occurrence increases total frost heaving and extends the thaw season.

SIP U6210

Beskow, G.
THE SIGNIFICANCE OF DRAINAGE FOR GROUND FROST CONDITIONS IN HIGHWAYS. SUMMARIZATION OF THE MOST SIGNIFICANT RESULTS OF INVESTIGATIONS IN PROCESS. II. (Dräneringens betydelse för vägarnas tjälförhållanden. Sammanfattning av de viktigaste resultaten av pågående undersökningar. II; Text in Swedish). Svenska Väginst. Medd. No. 15:5-16 incl. diagrs. graphs, 1929. 7 refs.
DPR, TE4650.S8A3, No. 15

A capillary saturated soil is one in which capillary water fills the spaces between the particles enveloped by adsorption water. The capillary heights of 7 different soil types are tabulated. Deep drainage operates in reducing frost heaving during fall and winter rather than during the thaw season. Drainage lowers the ground-water level before and during freezing whereby frost heaving (water absorption + ice accumulation) becomes reduced or even eliminated.

SIP U6211

Beskow, Gunnar
SIGNIFICANCE OF THE GEOLOGICAL FACTORS FOR GROUND FROST CONDITIONS IN HIGHWAYS. (De geologiska faktorernas betydelse för vägarnas tjälförhållanden; Text in Swedish). Svenska Väginst. Medd. No. 21:3-19 incl. illus. graphs, map, 1930. 6 refs.
DPR, TE4650.S8A3, No. 21

Alternate thaw weather and cold spells accompanied by precipitation is common in the southern and central parts of Sweden. These conditions are less frequent in Norrland. Deep frost penetration and snow cover and the peculiar geological conditions in Norrland are responsible for the frost depressions on highways and railroads. A map indicates 3 distinct geological regions in Norrland which are discussed according to range and frequency of frost settling. Spring thaw difficulties are due to a softening-up process of the road surface caused by meltwater and/or precipitation which cannot penetrate the soil due to its partially frozen state.

SIP U6212

Voskresenskiĭ, K. P.
SNOW COVER. (Snezhnyĭ pokrov; Text in Russian). Trudy Gosudarstvennogo Gidrologicheskogo Instituta, 12(66):34-36 incl. tables, map, 1948.
DLC, GB651.L38, v. 12(66)

An unstable snow cover usually appears in the central chernozem area between Oct. 24-Nov. 11. A stable snow cover was usually established between Oct. 26 in the Orël and Tambov provinces to Dec. 19 south of the Kursk and Voronezh provinces. The maximum depth was observed in early March. The snow cover disappeared between March 5 (southwest) and April 5 (northeast). Snow melting continued from 27-29 days (Tambov, Livny) to 33-37 days (Kursk, Orël). The water content of the snow before melting reaches a maximum of 120 mm. in the region of the central Russian plateau and diminishes to 60-80 mm. in the south.

SIP U6213

Voskresenskiĭ, K. P.
WINTER REGIME OF RIVERS. (Zimniĭ reshim rek; Text in Russian). Trudy Gosudarstvennogo Gidrologicheskogo Instituta, 12(66):58-63, 190-263 incl. tables, maps, 1948.
DLC, GB651.L38, v. 12(66)

Data obtained from 156 places of the Orël, Tambov, Kursk and Voronezh provinces up to 1947 are tabulated, mapped, and discussed. The autumn ice drifting varied from 10-15 days to 1 month. The average freeze-up occurred between Nov. 20 (northeast)-Dec. 5 (southwest), and breakup between March 20 (southwest)-April 10 (northeast). Ice cover on rivers in the central chernozem area is usually stable and lasts from 135-145 days in the north to 125 days in the south. Observations of the ice-cover thickness during 1931-1947 showed that mean values for the area were equal to 40-50 cm. and reached 60 cm. near the end of winter. The mean thickness during severe winters increased up to 70-80 cm., and were as low as 20-30 cm. during warm winters. Ice cover was usually thicker in small rivers than in large rivers.

SIP U6214

Barnes, Howard T.
NOTES ON FRAZIL AND ANCHOR ICE, WITH CONSIDERATIONS AS TO THE FREEZING POINT OF WATER. Trans. Roy. Soc. Can. 2d. ser. 5, Sec. 3:17-22 incl. tables, graph, 1899. 4 refs.
DN-HO, GB2401, Barnes

The density of ice varies within narrow limits depending on the age of the ice and the temperature of formation. Natural or old ice is denser than new or artificial ice by about 0.2%. Anchor ice grows more rapidly on dark objects, is absent under a cover of ice or a bridge, does not form on cloudly nights and disintegrates immediately under a bright sun, and is, therefore, a likely result of radiation. When a large quantity of river water at the f.p. is cooled rapidly, the temperature of the water does not remain at 0°C but drops a few thousandths of a degree. When ice is melting the temperature rises above the f.p. by the same amount. The quantity of ice and water and the rate of loss or gain in heat to the surroundings must be defined to determine the f.p. of water accurately.

SIP U6215

Barnes, H. T. and Cooke, H. Lester
ON THE DENSITY OF ICE. Trans. Roy. Soc. Can. 2d. ser. 8, Sec. 3:143-155 incl. illus. tables, diagrs. 1902. 29 refs.
DN-HO, GB2401, Barnes

Determinations of the density of ice since 1772 and the methods used are reviewed. Variations of results are believed to be caused by strains set up in the ice during formation. Such strains disappear in time and ice probably approaches a limiting value.

SIP U6216

Barnes, H. T.
ICE FORMATION IN CANADIAN WATERS AND THE PHYSICAL LAWS GOVERNING ITS FORMATION. Can. Soc. Civil Engrs. 9p. 1901.
DN-HO, GB2401, Barnes

The formation, growth, disintegration and decay of river ice are discussed. Water on being cooled drops in temperature until a definite point is reached where further abstraction of heat causes the formation of ice. The processes of heat dissemination through conduction, convection, and radiation are defined. The formation of ice over the surface of a quiet river or lake, when the air temperature drops below freezing, is the result of conduction and convection. Radiation is responsible for the formation

of ice spicules throughout the mass of water of a fast flowing river, the size of the spicules depending on the rate of flow. The rate at which heat is abstracted or supplied to a mixture of ice and water determines its temperature. The mixture becomes slightly supercooled to 0.006 of a degree below freezing when heat is lost rapidly. Sticky ice forms when the river is thrown in this supercooled state. The action of radiation in the formation of frazil and anchor ice is discussed. Rapid development of a surface layer of ice will prevent frazil ice formation.

SIP U6217

Barnes, Howard T. and A. S. B. Lucas
THE GROWTH OF ICE CRYSTALS IN THE BUNSEN ICE CALORIMETER. Trans. Roy. Soc. Can. 2d. ser. 10, Sec. 3:33-39 incl. graphs, diagrs. 1904.
DN-HO, GB2401, Barnes

Attempts made to obviate the slow increase in ice volume occurring when using the calorimeter for accurate work are summarized. The variation in the volume of ice mantles prepared by different means was studied. The mantle formed by the liquid air was clear at the start and became traversed by fine radial cracks after several hours. The mantle formed by a snow and salt mixture was cracked at the start and grew much faster. No explanation for the difference in behavior when using the different refrigerants is offered.

SIP U6218

Barnes, Howard T.
ANCHOR-ICE FORMATION FROM THE STANDPOINT OF THE RADIATION THEORY, TOGETHER WITH SOME EARLY MEMOIRS ON GROUND-ICE. Trans. Roy. Soc. Can. 2d. ser. 12, Sec. 3:65-109, 1906. 2 refs.
DN-HO, GB2401, Barnes

Anchor ice is attached or anchored to the bottom of a river. Other names given to this ice are: ground-ice, bottom-ice, ground-gru, lappered ice, glace-du-fond, moutonne ice, and Grund-eis. Anchor ice may form in situ on the bed of a river and may grow by attaching to itself frazil crystals brought down by currents or by slower process of radiation. Radiation of heat cooling the bottom of the river to establish the first layers of ice is the prime cause of anchor ice. The growth is due to the entangling and freezing of frazil crystals present in the water. Some early memoirs on ground ice are appended.

SIP U6219

Barnes, Howard T.
EQUILIBRIUM BETWEEN ICE AND WATER. Trans. Roy. Soc. Can. 3d. ser. 1, Sec. 3:29-30 incl. graph, 1908.
DN-HO, GB2401, Barnes

The temperature of equilibrium between ice and water is not absolutely constant but depends on the relative amounts of ice and water and the rate at which freezing or melting is progressing. Frazil ice is produced only in slightly supercooled water, and the ice crystal becomes a center of crystallization imparting its latent heat to the surrounding water. Freezing takes place along the surface of the ice and the water becomes supercooled when supercooled ice is brought in contact with water. Supercooling may exist for a long time with a large enough block of ice before the temperature gradually rising reaches the f.p. Ice being a better heat conductor than water, the latent heat is conducted away, cooling the water.

SIP U6220

Barnes, Howard T.
THE PHYSICAL CONSTANTS OF ICE. Trans. Roy. Soc. Can. 3d. ser. 3:3-27 incl. tables, 1909. 90 refs.
DN-HO, GB2401, Barnes

The summary of past research deals with density, heat of fusion, heat of sublimation, specific heat, thermal conductivity, coefficient of expansion, plasticity, elasticity, viscosity, regelation, tensile strength, compressibility, refractive index and color, electrical properties, and crystalline structure. The bibliography consists of articles on the physical constants of ice which have appeared from 1772-1909.

SIP U6221

Barnes, Howard T.
REPORT ON THE INFLUENCE OF ICEBERGS AND LAND ON THE TEMPERATURE OF THE SEA... Sessional Paper No. 21c, Suppl. 45th annual rept. Dept. Marine and Fisheries, 37p. incl. illus. tables, graphs, diagrs. appendices I, II. 1913.
DN-HO, GB2401, Barnes

A report on a 3-week study of the influence of ice and land on the temperature of the sea through the Strait of Belle-Isle and the Gulf of St. Lawrence is presented. The microthermometer used aboard ship is described. The temperature of the water invariably rises upon approaching an iceberg. This rise may or may not be followed by a drop in temperature. An explanation of the temperature rise based on absorption of the sun's radiation by the surface water is presented. The effect of land and shoals which reduce the temperature of water is discussed. The sound echoes from an iceberg are not a reliable means of iceberg detection. It is recommended that boats be equipped with accurate temperature recorders to warn of a nearby iceberg by the increased temperature of the water.

SIP U6222

Finkel'shteĭn, ÎA. B. and D. P. Mal'kovskiĭ
THAWING OF DEEPLY FROZEN GROUND. (Glubinnoe ottaivanie merzlykh gruntov; Text in Russian). p.36-59 incl. illus. tables, diagrs. (In: Ottaivanie merzlykh gruntov dlîa prokladki podzemnykh kommunikatsiĭ, by ÎA. B. Finkel'shteĭn and D. P. Mal'kovskiĭ, Moscow-Leningrad, Gosudarstvennoe Izd-vo Lit-ry po Stroitel'stvu i Arkhitekture, 1952). 1 ref.
DLC, TA713.F55, 1952

Deeply frozen ground is thawed by passing a current through the ground between open-type vertical electrodes, and with electric and hot water needles. Experimental gas and electric needles filled with a liquid are also described. Steel electrodes, 1.4-1.6 m. long and 16 mm. in diam., with sharp points are driven into the ground by hand or with a hydraulic hammer along lines, 1.2-1.5 m. wide, at distances of 30-60 cm. depending on the voltage used (120, 220 or 380 v.). Electric needles consisting of 2 steel pipes of 12 mm. in diam. with resistance elements provided by 2 spirals, about 135 cm. long are inserted into the ground to a depth of 128 cm. Technical characteristics of needles and requirements of mobile electric stations are tabulated.

SIP U6223

Jakob, M. and S. Erk
THE THERMAL CONDUCTIVITY OF ICE BETWEEN 0° AND -125°C. (Die Wärmeleitfähigkeit von Eis zwischen 0 und -125°; Text in German). Z. ges. Kälte-Ind. 36:229-234 incl. tables, graph, diagrs. 1929. 13 refs.
DA, 295.8Z3, v. 36

The thermal conductivity of ice was measured by exposing specially prepared ice plates to heat flow in a vacuum container and measuring the temperature difference between the top and bottom plates. The ice plate is frozen between Cu plates in the same apparatus, using distilled water, and cooling the apparatus by means of liquid air. The temperature was measured in the Cu plates during preliminary experiments, which resulted in unlikely conductivity values. Thermoelements frozen into the ice plates were used in the main experiments. It was determined that a temperature differential exists at the boundary layer between Cu and ice which increased with decreasing temperatures. The final thermal conductivity values were calculated by means of an equation which considers bending of the isotherms and density variations of the heat current. The values range from 1.92 kcal./m. hr. °C at 0°C to 3.4 kcal./m. hr.°C at -130°C. The values are compared with those obtained by other observers.

SIP U6224

Becker, Richard
A RELATIONSHIP BETWEEN ANNUAL SNOW DEPTH AND SURFACE INCLINATION OF THE GREENLAND INLAND ICE. (Eine Beziehung zwischen jährlicher Schneehöhe und Neigung der Oberfläche des Grönländischen Inlandeises; Text in German). Ann. Hydrographie u. Maritim. Meteorologie, 61:246-251, graph, Aug.-Sept. 1933. 2 refs.
DLC, VK798.A6, v. 61

A theoretical analysis is made of snow depth measurements on the Greenland Ice Cap in order to correlate them with systematic influences caused by surface peculiarities of the Ice Cap. Data obtained by the De Quervain (1912) and Koch and Wegener (1913) expeditions are used. The distribution of the snow depths across the inland ice is plotted, which indicates the existence of a minimum zone, flanked by 2 maxima, near the maximum depth of the Ice Cap. It is concluded from the contours of the inland ice surface and the mean normal wind directions, that the air generally flows downwards along the terrain by way of the shortest path. The influence of snow drifting and cyclones is indicated. The snow depth curves are analyzed to show a dependency on the terrain gradient by calculating curves which represent the reciprocal values of the terrain inclinations along the expedition routes. The resulting values are compared with observed values, and a good correlation is shown.

SIP U6225

Kondrat'eva, A. S., I. V. Kragel'skiĭ, and A. A. Shakhov
INCREASE OF SNOW DENSITY UNDER A COMPRESSIVE LOAD. (Uvelichenie plotnosti snega pod vliîaniem szhimaîushcheĭ nagruzki; Text in Russian). p.5-9 incl. tables, graphs. (In: Fiziko mekhanicheskie svoĭstva snega i ikh ispol'zovanie v aerodromnom i dorozhnom stroitel'stva, Moscow-Leningrad, Izdatel'stvo Akademii Nauk SSSR, 1945)
DLC, QC929.S7A5, 1945

The relation between pressure applied to a snow cover and its density was investigated. Snow with an initial density of 0.15 varied under field conditions from 0.34-0.41 at pressures of 0.05-0.8 kg./sq. cm. at a temperature of -10.8°C and from 0.33-0.59 at a temperature of -1.3°C for snow of initial density of 0.18. Snow density under a pressure of 0.4 and 0.6 kg./sq. cm. varied from 0.56-0.36 and from 0.58-0.37 at temperatures of -1.3° to -15.8°C respectively. Laboratory measurements of snow density at temperatures ranging from -1.5° to -21°C are given. The results indicate that the best temperature for packing snow is near 0°C and that the use of heavier packing machines will not increase the density beyond a certain limit. Snow density increases with increased temperature. Snow compacts best in thin layers.

SIP U6226

Gorodkov, B. N.
PECULIARITIES OF THE SOIL COVER IN THE ARCTIC. (Ob osobennostiakh pochvennogo pokrova Arktiki; Text in Russian). Izvestiia Gosudarstvennogo Geograficheskogo Obshchestva, 71:1516-1532 incl. tables, map, 1939. 49 refs.
DLC, G23.R6, v. 71

Geomorphology, climate, vegetation and general characteristics of hydrothermal regime of tundra soil are reviewed. The deceleration of the soil-forming processes at low temperatures and high moisture content of the relatively thin active layer are characteristics of the arctic soil cover. Annual temperatures varying from -7.65° to -15.4°C and mean summer temperatures ranging from -0.4° to 12.7°C result in the condensation of water vapor from lower cold layers of permafrost (-6° to -8°C) in northeastern Asia. The disintegration of peat and humus horizons in spotted tundra is produced by the mechanical action of wind and snow. Superficial salinity and high carbonate content of spotted and polygonal tundra soil is caused by aeration of denuded transition horizons. A vertical water migration occurs in summer and in autumn during the freezing of wet tundra soils. Snow corrasion and ice crust formation are main factors in the disintegration of the peat sod of moss covered tundra.

SIP U6227

Sveshnikov, P. I.
THE CLIMATE OF UFA. (Ocherk klimaticheskikh uslovii goroda Ufy; Text in Russian). Ufa, 1909, 71p. incl. tables.
DLC, QC989.R6U45, 1909

The climatic description is based on observational data of 1886-1908. Normals and monthly means for each year of temperature, humidity, pressure and precipitation are tabulated and discussed. The snow cover lasts an average of 173 days from Oct.-May attaining a maximum of 197 days in 1902 and a minimum of 156 days in 1900. The maximum depth of the snow cover occurs in March, averaging 74 cm. with extremes of 109 and 46 cm. Long term data (1780-1908) are tabulated for each year and indicate the characteristics of the ice regime of the Belaya River. These data show that the river was ice covered from Nov. 16-April 25, with extremes on Oct. 21 (1785) and May 6 (1793). The latest freeze-up occurred on Dec. 18 (1874) and the earliest breakup on April 2 (1906).

SIP U6228

Zalkov, B. D.
RIVER DISCHARGE INTO THE LAPTEV AND EAST SIBERIAN SEAS AND THE AMOUNT OF HEAT CARRIED INTO THE SEAS BY THE RIVERS. (Rechnoi stok v more Laptevykh i Vostochnosibirskoe i kolichestvo perenosimogo im v eti morfa tepla; Text in Russian with English summary). Trudy Arkticheskogo Instituta (Leningrad), 35:51-84 incl. tables, graphs, 1936. 30 refs.
DLC, G600.L4, v. 35

The data indicate that the average depth of the snow cover in this region varies from 15-64 cm., with a low of 15-27 cm. in the Lena river basin and a high of 95 cm. along the Amur-Yakutsk road. Ground ice is common in this region of continuous permafrost. The thickness of the permafrost varies from over 100 m. at Yakutsk to 45 m. in the lower reaches of the Lena River. The area is characterized by the irregular discharge of rivers (85-95% of the annual discharge occurring in 4 summer months), solid freezing of larger rivers, and the non-freezing of smaller mineralized rivers. The annual computed heat discharges into the Laptev and East Siberian Seas is approximately 5000 x 10^{12} and 1150 x 10^{12} cal.

SIP U6229

Barnes, Howard T.
FORMATION OF ANCHOR ICE AND PRECISE TEMPERATURE MEASUREMENTS. Trans. Am. Soc. Mech. Engrs. 26:558-583 incl. illus. tables, graph, diagrs. 1905.
DLC, TJ1.A7, v. 26

The methods of heat transmission and the physical properties of ice and water are reviewed. The relations between the temperature of water and the formation of anchor ice on the bottom of the river were studied. The temperature of the water was measured to 0.0001 of a degree C. by a differential thermometer having a degree calibration 8 in. long. The maximum variation in the river temperature was 0.006°C with an air temperature varying from -28° to 40°F. These temperature measurements made concurrently with observation of the state of the river, clearness of sky, wind velocity, and percent of sunshine over a period of 6 weeks show that the temperature margin between disintegration of ice and formation of ice is exceedingly narrow, a few 0.001°C. The electrical thermometers used are described.

SIP U6230

Molchanov, P. A.
ICING CONTROL OF AIRCRAFT PARTS. (Bor'ba s obledeniem letatel'nykh apparatov; Text in Russian). Nauka i Zhizn', 7, No. 10:6-10 incl. illus. diagrs. 1940.
DLC, Q4.N43, v. 7

Aircraft icing was observed under various cloud conditions, heights and within a temperature range of +1° to -15°C. Maximum icing occurred in clouds containing supercooled droplets, 0.018-0.012 mm. in diam. and in mixtures of ice crystals and supercooled droplets. The de-icing methods described consist of resinous and oil applications and the use of such ice solvents as $C_2H_4(OH)_2$ and C_2H_5OH. The recommendations include heating small wing surfaces with exhaust gas and warning systems indicating incipient ice formation. (See also SIP U3925)

SIP U6231

Sedov, V. and P. Shvetsov
UNDERGROUND WATER AND NALEDS IN THE NORTHERN YAKUTSK. (Podzemnye vody i naledi v Severnoĭ Iakutii; Text in Russian). Nauka i Zhizn', 7, No. 2:16-18 incl. illus. 1940.
DLC, Q4.N43, v. 7

Proof is presented indicating that the gigantic icings in Yakutsk are not caused by seepage of river water, but by subterranean water forced to the surface through fissures in the bedrock. These conclusions are based on the findings in the lower reaches of the Kyra River near the Yano-Indigirka water divide. The total discharge of these icings is evaluated at 3000 l./sec. The water remains liquid within the ground even at air temperatures of -70°C. Three naleds with a maximum thickness of 6 m. were found within an area of 20 sq. km. The utilization of these non-freezing waters as water supply for new settlements is suggested. (See also SIP U3519)

SIP U6232

Kantrowitz, Arthur
AERODYNAMIC HEATING AND THE DEFLECTION OF DROPS BY AN OBSTACLE IN AN AIR STREAM IN RELATION TO AIRCRAFT ICING. NACA Tech. Note No. 779, 9p. graphs, diagr. Oct. 1940. 6 refs.
DLC, TL521.A35, 1940

The temperature rise of surfaces exposed to boundary layer friction materially reduces the amount of heat required to prevent icing. Airplanes traveling at speeds greater than 300 m.p.h. do not experience severe icing conditions. Numerical calculations of the paths of water drops in an air stream around a circular cylinder are given. The area swept clear of drops and the region of the cylinder struck by drops are plotted. The region struck by the drops would be the area covered with ice if the drops were of uniform size and froze on contact.

SIP U6233

Willmot, J. G.
MEASUREMENT OF ICE THRUST ON DAMS. Ontario Hydro Res. News, 4, No. 3:23-25 incl. illus. diagr. July-Sept. 1952.
SIPRE files

The horizontal thrust from a solid sheet of ice is one of the more uncertain loading forces applied to a dam and allowances used vary from 0 to over 50,000 lb./lin. ft. An ice thrust of 15,000 lb./ft. has the same tendency to tip a 40-ft. high dam as the water which it has been designed to hold. Thrust measuring techniques were devised by freely suspending a reinforced concrete panel in the upstream face of a dam and using 4 weighing cells to measure the force of the ice on the panel. Thermal expansion of the ice, changes in forebay elevation, and wind friction contribute to the ice pressure. Available meteorological records are analyzed to estimate the causes of ice thrust increase. A thermal thrust of 4900 lb./ft. was produced by an air temperature rise of 4.2°F/hr. Temperature rises of 10°-12°F can develop a 20,000 lb./ft. thermal thrust in 18-in. thick ice. Thrusts of 1000 lb./ft. were caused by 20 m.p.h. winds in the 1951-52 season. Low initial ice temperatures, fast and prolonged rises in air temperatures, winds warmer than the ice, full sunshine, thick ice and absence of a snow cover are the conditions most conducive to the production of high ice thrust.

SIP U6234

Conrad, V.
AN UNDERWATER STRUCTURAL SOIL IN THE EASTERN ALPS. (Ein Unter-Wasser-Strukturboden in den Ostalpen; Text in German with English summary). Gerlands Beitr. Geophys. 40:353-360 incl. illus. diagr. 1933. 10 refs.
DLC, QC801.B3, v. 40

A well-developed structural soil was found on the bottom of the Grüne See (a small lake in Styria, Austria), about 1 m. below the water surface. The most marked polygons have a diagonal diam. of 180-250 cm., and the lesser ones 18-40 cm. The outlines are formed by stones weighing 2 kg. and more. The lake surface is subjected to great variations, causing the polygonal terrace to be exposed during part of the winter. The formation is attributed to the periodical freezing and thawing of the soil which produces a sorting of the ground according to size, in accordance with Högbom's hypothesis. This hypothesis, however, fails to explain all the observed facts involved.

SIP U6235

Beskow, Gunnar
THE GENERAL BREAKUP OF THE SURFACE OF HIGHWAYS DURING SPRING THAW. (Om vägarnas allmänna ytuppmjuking i tjällossningen; Text in Swedish). Svenska Vägförening. Tid. 18:28-38 incl. illus. table, graphs, Feb. 5, 1931. 5 refs.
DPR, Unclassed periodical

Field observations and test material from highways showed that not only the surface water but water drawn from subgrade layers is responsible for breakup. The common breakup is meteorologically conditioned (temperature controlling the speed of ground freezing), whereas depth breakup depends on geological factors. The correct size of particles as used in the right quantity of chosen subgrade material is an excellent countermeasure for both types of breakup.

SIP U6236

Höckert, Gunnar
CARE OF HIGHWAYS DURING SPRING THAW. (Vägarnas behandling vid tjällossning; Text in Swedish). Svenska Vägförening. Tid. 18:162-166 incl. illus. April 15, 1931.
DPR, Unclassed periodical

The significance of adequate drainage of the water trapped on a road surface during spring thaw is discussed and some practical methods were devised. Gravel was used to fill holes, ruts, and other defects caused by road breakup in southern Sweden. The results were satisfactory.

SIP U6237

Beskow, Gunnar
THE SPRING THAW OF THIS YEAR IN THE STOCKHOLM AREA. (Årets tjällossning i Stockholmstrakten; Text in Swedish). Svenska Väförening. Tid. 18:229-240 incl. illus. June 5, 1931.
DPR, Unclassed periodical

Road breakup was unusually severe in 1931. The causes were clearly linked to meteorological conditions. During April the temperatures were low (1.7°C below normal) and the precipitation was scant (65% of normal). Precipitation was high from Sept. through Jan. (115-199% of normal). Snow retarded soil freezing during the early winter months; plowing accelerated soil freezing under highways. These conditions allowed excessive infiltration of meltwater and subsequent increase in ground water. Adequate drainage is recommended to alleviate road breakup. Even the muddiest soils in Norrland were trafficable when drained to depths of 1.7-1.8 m.

SIP U6238

Tûlina, L. N.
FOREST VEGETATION OF THE ANADYR BASIN AND ITS INTERRELATIONS WITH THE TUNDRA. (O lesnoĭ rastitel'nosti Anadyrskogo kraĭa i ee vzaimootnoshenii s tundroĭ; Text in Russian with English summary). Trudy Arkticheskogo Instituta (Leningrad), 40:7-212 incl. illus.tables, map, 1936. 39 refs.
DLC, G600.L4, v. 40

The results of the geobotanical expedition to the Anadyr river basin in 1931-32 are presented. Forest-free tundra predominates, even though the greater part of this region is south of the Polar Circle. The average thickness of the active layer is 40-60 cm. in the plain tundra and 60-80 cm. on the slopes of mountain tundra. Permafrost near the surface with new tree growth among the dead and dying trunks of larch is a characteristic feature of the boundary line between the flood-plain and terrace tundra. Dwarf pine, which bends to the ground when freezing, is 0.75-1.5 m. high and covers 40-50% of the area. No recession of the forest line was observed in Anadyr although the trend has been southward in Eurasia.

SIP U6239

Siegenthaler, Jakob
GROUND TEMPERATURES AS AFFECTED BY EXTERNAL METEOROLOGICAL FACTORS. (Bodentemperaturen in Abhängigkeit von äusseren meteorologischen Faktoren; Text in German). Gerlands Beitr. Geophys. 40:305-332 incl. tables, graphs, 1933. 13 refs.
DLC, QC801.B3, v. 40

Soil temperatures at Giesenheim/Rhine (Germany) are analyzed on the basis of observation data from 1918-1930. Measurements were made 3 times daily at depths of 10, 20, 50, and 100 cm. using Hg thermometers. The snow cover was retained on the plot. The thermal properties of the soil are derived including the mean annual heat flow at various depths. Meteorological effects on soil temperatures are obtained by calculating the share of the individually effective factors in producing the mean annual soil temperature course, and by comparing soil temperature deviations with anomalies of meteorological elements in individual years. Results indicate that precipitation decreases the soil temperature by transmitting its own temperature to the soil and by withdrawing heat through evaporation. Small amounts of precipitation increase the thermal diffusivity, and large amounts decrease it again.

SIP U6240

Tikhomirov, B. A.
DWARF PINE, ITS BIOLOGY AND UTILIZATION. (Kedrovyĭ stlanik, ego biologiĭa i ispol'zovanie; Text in Russian). Materialy k Poznaniû Fauny i Flory SSSR. Novaĭa Seriĭa, Otdel Botanicheskiĭ, 6:1-106 incl. illus. tables, maps, diagrs. 1949. 230 refs.
DLC, QH161.M3, v. 6

Dwarf pine is a typical mountain coniferous plant growing in peat-podzol transition soil through the peat-moss cover over a wide area of East Asia. It adapts readily to severe climatic and permafrost conditions. The trunk (1.2 m.-2.5 m. long) and its branches bend to the ground about 0.25 of their height on cold nights and straighten during the day. This reaction is due to an uneven expansion of the freezing water in the upper and lower parts of the wood. The tree becomes snow covered during the winter and is thus protected against snow corrasion in the windy tundra region. Dwarf pine is important for determining the forest boundary lines, for preventing slope erosion and maintaining fauna. Dwarf pine is recommended for snowdrift protection on roads.

SIP U6241

Parkhomenko, S. G.
INSTRUCTION FOR THE STUDY OF STRUCTURAL SOILS. (Instruktsiĭa po izucheniû strukturnykh pochv; Text in Russian). p.139-143 incl. illus. (In: Sbornik instruktsiĭ i programmnykh ukazaniĭ po izucheniû merzlykh gruntov i vechnoĭ merzloty, Moscow-Leningrad, 1938). 6 refs.
DLC, GB648.55.A7, 1938

Structural soils are defined and classified as to wreath tundra with stone wreaths surrounding fine earth masses, polygonal soils or soil polygons, stone nets or honeycomb soils, rubble islands in stony fields or patchy tundra, stone strips or striated soils. Structural soils are found in low-level polar regions, in temperate regions near the snow line and in tropic regions at 5 km. elevation. Different types of structural soils and their intermediate stages are studied. The internal structure is in-

vestigated on the basis of samples and photographs of various profiles in thawed and frozen states. Records are made of geographical location, topographical, climatic and geomorphological conditions, origin, annual temperature course and humidity relationships of the soil cover and the character of vegetation cover.

SIP U6242

Akademiîa Nauk SSSR. Komitet po vechnoĭ merzlote
PROJECT OF INSTRUCTIONS FOR PERMAFROST INVESTIGATIONS FOR CONSTRUCTION PURPOSES. (Proekt instruktsiĭ po issledovaniîu vechnoĭ merzloty v stroitel'nykh tselîakh; Text in Russian). p.253-272. (In: Sbornik instruktsiĭ i programmnykh ukazaniĭ po izucheniîu merzlykh gruntov i vechnoĭ merzloty, Moscow-Leningrad, 1938)
DLC, GB648.55.A7, 1938

Additional instructions for technical investigations in permafrost regions are summarized. Basic ideas are presented for conducting investigations at the construction sites of industrial and civic buildings, water supply and drainage, railroads and highways. Selection of sites is preceded by preliminary investigations, frost-lithological photographs, test drilling operations and geophysical and hydrological observations. The investigations refer to the depth, thermal regime and type of the active layer and geographical distribution of permafrost, relief character, suprapermafrost underground water and ice inclusions. Leveling and grading operations were conducted using iron pipes, at least 6 cm. in diam. and 3 times the length of the active layer depth perforated at the lower half and equipped with a peep hole. Water-bearing layers, taliks, geological stratification, specific gravity, water content and grain size of ground are determined and temperature readings are taken at 0.5-m. intervals in pits up to 20 m. below the surface. Results of investigations are mapped and tabulated.

SIP U6243

Bigelow, Frank H.
THE CATCHMENT OF SNOWFALL BY MEANS OF LARGE SNOW BINS AND TOWERS. Monthly Weather Rev. (U. S.), 38:968-973 incl. illus. tables, diagrs. June 1910.
DLC, QC983.A2, v. 38

Various apparatus to measure the true catchment of snow were erected side by side at a number of stations in 13 western states. The total monthly amounts of snow caught at the stations are tabulated and analyzed. The 10-ft. square platform laid on the ground is unserviceable. The 10-in. diam., 10-ft. high standpipe is liable to 20-50% deficiency in catch. A plain 5-ft. cubical bin on a 5-ft. high stand catches a normal amount of snow and distributes it unevenly on the floor. A bin with inside louvres catches a normal amount of snow and distributes it evenly on the floor. Bins with outside louvres need more experimentation with louvre shape. The vertical snowscale is useful in measuring the current depth of snow on the ground. The W. B. rain and snow gage has the defect of the 10-in. standpipe and should be placed within and near the center of each snow bin for measures of rain and wet snow.

SIP U6244

Edwards, Robert C. and George W. Brock
METEOROLOGICAL ASPECTS OF PRECIPITATION STATIC. J. Meteorology, 2:205-213 incl. graphs, maps, Dec. 1945. 6 refs.
DLC, QC851.A283, v. 2

Autogenous and exogenous electrification of aircraft in flight can cause loss of radio communication for long periods of time. Serious autogenous electrification occurs when snow or dust strike the surface of the aircraft. In the case of snow, electrification is proportional to the snow density and to the cube of the air speed, while particle size and type are negligible.

SIP U6245

Christie, A. W.
THE LUMINOUS DIRECTIONAL REFLECTANCE OF SNOW. J. Optical Soc. Am. 43:621-622 incl. diagr. July 1953. 5 refs.
DLC, QC350.06, v. 43

The limitations of small-scale goniophotometers in investigating highly specular reflectance are presented. The theoretical part of Middleton and Mungall's paper considered sample and source as infinitesimal and the receiver finite. It is suggested that the case of an aircraft pilot looking at a point on the snow-covered ground be represented by an infinitesimal receiver and sample and a finite source. The angles subtended by the source, the sample and the receiver in the goniophotometer are too large, and the sample too small. It is suggested that the dimensions of the apparatus be increased to allow the examination of a sample large enough to be representative of the whole. (See also SIP US151)

SIP U6246

Pettit, K. G.
"THE ROCKCLIFFE ICE WAGON" AND ITS ROLE IN CANADIAN ICING RESEARCH. Roy. Meteorological Soc. Can. Branch, 2, No. 5:1-15 graphs, Sept. 27, 1951. 19 refs.
SIPRE files

A brief description of the icing research North Star aircraft known as Rockliffe Ice Wagon is given. The principles and recent trends of electro-thermal propeller and wing de-icing are outlined. The nephelometric instrumentation of the aircraft is described, and a preliminary analysis is presented of measurements of liquid water contents and temperatures of supercooled clouds encountered during 1950 and 1951 icing research flights. The need for statistical data on which to base meteorological design criteria for aircraft icing protection is stressed and plans to fit simple liquid water content instruments to airline aircraft are described. (Author's abstract)

SIP U6247

Quan, B. and H. G. Wenham
SOME TESTS OF A REFRIGERATED ROTATING CYLINDER FOR MEASURING ICE ACCRETION. Lab. Rept. LR-45, Natl. Aeronaut. Establishment Can. 3p. tables, graphs, diagrs. appendix, May 31, 1952. 2 refs.
DLC, G.P.R.R.

A large proprtion of the water impinging on an uncooled rotating cylinder or on a cylindrical ice detector-head blows off before it can freeze under certain icing conditions. Comparative measurements of liquid water content were made during the winter of 1951-52 using uncooled and cooled rotating cylinders. The limiting water content, measurable with an uncooled rotating cylinder, approximates the theoretic limit predicted by Ludlam. Water contents above the Ludlam limit may be measured with a refrigerated cylinder. (Authors' abstract)

SIP U6248

Gray, Vernon H. and Uwe H. von Glahn
EFFECT OF ICE AND FROST FORMATIONS ON DRAG OF NACA 65_1-212 AIRFOIL FOR VARIOUS MODES OF THERMAL ICE PROTECTION. NACA Tech. Note No. 2962, 68p. incl. illus. graphs, June 1953. 7 refs.
DLC, TL521.A35, No. 2962

Effects of primary and runback icing and frost formations on the drag of the 8-ft. chord airfoil section were investigated over a range of angles of attack from 2°-8° and airspeeds up to 260 m.p.h. for icing conditions with liquid-water contents ranging from 0.25-1.4 gm./cu. m. and datum air temperatures of -30°F. Glaze formations on the upper surface near the leading edge of the airfoil caused large and rapid increases in drag, especially at datum air temperatures near 32°F with high rates of water catch. Rime ice occurring at lower temperatures did not appreciably increase the drag coefficient. Cyclic de-icing of the primary ice formations on the airfoil leading-edge section permitted the drag coefficient to return almost to the bare airfoil drag value. Runback icing on the lower surface did not present a serious drag problem except when heavy spanwise ridges of runback ice occurred aft of the heatable area. Frost formations caused rapid and large increases in drag with incipient stalling of the airfoil. (Authors' abstract)

SIP U6249

Bykov, N. I.
THE EXPERIENCE OF A PERMAFROST STATION. (Iz praktiki raboty merzlotnoĭ stantsii; Text in Russian). Stroitel'naîa Promyshlennost', 15, No. 7-8:24-28; No. 11:27-30 incl. illus. diagrs. 1937.
DLC, TH4.S85, v. 15

Thorough knowledge of ground conditions to depths of 2 m. below the permafrost table is essential for planning construction projects in permafrost regions. Some of the factors which must be determined are snow and/or vegetative cover, the composition, stratification, moisture content, and compressive strength of the soil. The instruments used to determine these qualities include soil thermometers enclosed in ebonite tubes, heavometers (graduated rods to measure heaving at various depths) and apparatus for measuring adfreezing strength.

SIP U6250

Barnes, Howard T.
ON THE ARTIFICIAL PRODUCTION OF FRAZIL ICE, TOGETHER WITH MEASUREMENTS OF THE TEMPERATURE CONDITIONS IN THE WATER. Trans. Roy. Soc. Can. 2d. ser. 10, Sec. 3:29-32, 1904. 1 ref.
DLC, AS42.R6, 2d. ser. v. 10

Artificial formation of frazil ice was obtained by boiling liquid air and allowing the cooled air to bubble through water at the f.p. Temperature measurements of the water were made with a pair of differential Pt thermometers having a scale of 10 cm./°C on a resistance box. The temperature drops, reaches -0.0140°C as the ice begins to form, and then rises to -0.0060°C when the ice-water mixture contains 20% ice. A suitable device for warming water to the f.p. at the place where the effects of frazil ice should be tempered will obviate frazil trouble.

SIP U6251

Dubakh, A. D.
INFLUENCE OF FOREST DISTRIBUTION ON SPRING FLOODS IN RIVER BASINS. (Vliîanie razmeshcheniîa lesa po vodosboru reki na vesennie pavodki; Text in Russian). Meteorologiîa i Gidrologiîa, No. 9:33-41 incl. tables, diagrs. 1936. 14 refs.
DLC, QC851.M27, 1936

Investigations near Moscow, Voronezh and other places showed a wide variability in the water storage of snow in open and forested areas. The greatest amount of water is accumulated by snow in forest clearings, followed by deciduous forests, fields, and pine forests. The least amount is accumulated in spruce forests. The smaller amount of water stored in coniferous forests is explained by the amount of snow deposited on coniferous needles, which is lost largely through evaporation. Observational data indicate that snow melting begins later in the forests (up to 30 days) than in the fields and at higher air temperatures. The duration of snow melting in forest zones is, therefore, approximately equal to that in fields.

SIP U6252

Ivanov, B. G.
FIELD INVESTIGATIONS OF THE THERMAL REGIME OF SOIL. (Polevye issledovaniîa teplovogo rezhima pochvy; Text in Russian). Meteorologiîa i Gidrologiîa, No. 9:56-61 incl. tables, diagr. 1936. 1 ref.
DLC, QC851.M27, 1936

A field thermometer for measuring soil temperature variations is described. A Hg thermometer was enclosed in a wooden tube, 18-19 mm. in diam. and 1.7 m. long, the bulb of which was covered by an iron cap held in place with a mixture of paraffin and iron filings. Holes in the soil were made with a graduated steel bar. Good agreement with the readings on standard equipment was obtained after a 30-min. period of exposure in the soil. Shorter exposure periods, especially under winter conditions, produced an accuracy less than 0.2°C. Experimental observations made in Feb. 1936 in forests, fields and swampy areas at different snow cover depths and densities are tabulated.

SIP U6253

Sapozhnikova, S. A.
THE MICROCLIMATE AND LOCAL CLIMATE. (Mikroklimat i mestnyĭ klimat; Text in Russian). Leningrad, Gidrometeorologicheskoe Izdatel'stvo, 1950, 240p. incl. tables, diagrs.
DLC, QC981.S33, 1950

Original microclimatic data are presented. Problems on the thermal processes in the soil, the effect of snow cover on soil temperature, and heat exchange between soil and air are analyzed. The distribution of the snow cover according to depth is related to the relief. Snow density depends largely on air temperature. The density of fresh snow increases from 0.07-0.2 through a temperature rise from -10° to +2°C. The thermal inversion near the snow surface is especially pronounced with the advection of air masses at temperatures over 0°C.

SIP U6254

Zhikin, A. K.
SNOW COVER INFLUENCE ON LEVEL OF SPRING FLOODS. (Vliîanie snegovogo pokrova na gorizont vesennikh polovodiĭ; Text in Russian). p.271-286 incl. tables, diagrs. (In: Sverdlovskaîa Magnitnaîa i Meteorologicheskaîa Observatoriîa, 1836-1936, IUbileĭnyĭ Sbornik, Sverdlovsk, 1936)
DLC, QC989.R6E4, 1936

Snow cover data from 1896-1920 were analyzed. Autumn soil moisture, frost penetration, and rate of spring snow melting are important factors determining the levels of spring floods. Heavy precipitation during Sept.-Nov. considerably increases soil moisture, which induces deeper soil freezing in winter and reduces infiltration into the soil of spring meltwaters. Correlation between the height of spring floods and the depth of snow cover was 0.814; between the amount of autumn precipitation and the spring water levels, 0.52; and between height of spring flood and the combined influence of autumn precipitation and snow cover depth, 0.836. Records of 25 yr. indicated that the maximum snow cover depth varied there from 50-117 cm. and snow-melting period continued from 25-75 days in the Upper Kama region. The rate of snow melting is a factor important for accurate forecasting of spring floods.

SIP U6255

Samokhin, A. F.
ISLANDS OF ANCHOR ICE IN THE DON RIVER. (O pîatrakh na Donu; Text in Russian). Meteorologiîa i Gidrologiîa, No. 10:57-61 incl. table, diagr. 1936.
DLC, QC851.M27, 1936

Islands of anchor ice (pyatry) extending throughout the depth of the river were observed in the Don River near Kazanskaya on Nov. 20, 1935. These ice islands developed over a sandy river bottom in the form of ice cylinders, 2-3 m. in diam. Crystalline formations, 10-12 m. long and 2-4 m. wide, rose close to the water surface. The daily air temperature ranged from 5.9°C to -10.4°C during the formation of these islands. The areas where these formations appeared have not been ice-covered for many years.

SIP U6256

Zelenoĭ, I.
THE SPRING FLOODS OF THE VOLGA RIVER NEAR YAROSLAVL AND THE SNOW COVER. (O zavisimosti ob"emov vesennikh pavodkov Volgi u îAroslavlîa ot zapasov snega; Text in Russian). Meteorologiîa i Gidrologiîa, No. 9:42-49 incl. tables, graphs, 1936. 2 refs.
DLC, QC851.M27, 1936

Data on water precipitation, flood run-off and the maximum depth of snow cover for the region near Yaroslavl during the period 1892-1929 are tabulated and analyzed. The correlation between winter precipitation and flood run-off was less than 0.5. It is believed that the winter precipitation measurements were inaccurate due to loss of catchment in the gages through winds. Interrelations between the amount of water calculated from maximum snow depth, and the range of flood run-off gave a correlation of 0.70. The correlation was increased to 0.81 by adding 50% of the spring precipitation to the winter precipitation. Analysis of snow cover density data indicated that the average density was near 0.20 in winter without thaw weather, 0.25 in winter with occasional thaw weather, and 0.30 during frequent or intensive thaw weather.

SIP U6257

Harding, J. B. and others
ABSORPTION OF STAR-PRODUCING RADIATION UNDER ICE. Nature, 163:319-320 incl. table, graph, Feb. 26, 1949. (Letters to the editors). 3 refs.
DLC, Q1.N2, v. 163

The absorption of radiation under ice was measured to determine whether the difference in absorption obtained for air and lead is due to a difference in atomic weight of the absorbers or a difference in their densities. Boxes of Ilford C2 plates, 100 μ thick were exposed horizontally in a glacier crevasse approximately 10 cm. wide at Jungfraujoch at an elevation of 3650 m. The number of stars re-

corded at ice depths varying from 0-5.5 m. are tabulated. The calculated range of the star-producing radiation in ice is 1.33 times that in air. It is concluded that the stars are produced by stable particles, their range depending on the atomic weight of the absorber.

SIP U6258

Lattimore, S.
RATE OF PRODUCTION OF NEUTRONS IN ICE BY COSMIC RAYS. Phil. Mag. 42:331-337 incl. graphs, April 1951. 11 refs.
DLC, Q1.P5, v. 42

The rate of production of fast neutrons in ice is given. The number of fast neutrons produced at any point in the ice is approximately proportional to the number of cosmic ray stars at that point. The results are compared with those of other investigations, and it is pointed out that many previous results are too low due to the misuse of a formula given by Bethe and others. (Author's abstract)

SIP U6259

French, A. P. and F. G. P. Seidl
THE ENERGY LOSS OF SLOW DEUTERONS IN HEAVY ICE. Phil. Mag. 42:537-554 incl. graphs, tables, May 1951. 11 refs.
DLC, Q1.P5, v. 42

Experimental evidence on the energy losses of protons and deuterons in materials of low atomic number, at energies below about 350 keV. is reviewed. The discrepancies between results of different experiments are discussed. A plausible curve of energy loss as a function of energy for deuterons in heavy ice at energies below 700 keV. is attempted. The region 0-100 keV., which is of considerable interest in the study of the D-D reaction, is given special attention. (Authors' abstract)

SIP U6260

Harding, J. B. and D. H. Perkins
PRODUCTION OF HEAVY MESONS IN COSMIC RAY STARS. Nature, 164:285-287 incl. table, graphs, Aug. 13, 1949. 8 refs.
DLC, Q1.N2, v. 164

The rate of production and energy spectrum of π-mesons were approximately determined from measurements of their absorption in dense matter. Boxes of Ilford C2 plates, 100 μ thick were exposed horizontally in a glacier crevasse approximately 10 cm. wide at Jungfraujoch at an elevation of 3650 m. The numbers of heavy π^+ and π^- mesons coming to rest in the plates at different depths are tabulated. The mean range is determined as 100-200 gm./sq. cm. of ice. The experimental results are consistent with the assumption that the direct production of μ-mesons from stars formed in the ice is small compared with the rate of production of the π-mesons, permitting a lower limit to the life-time of heavy mesons. The μ-mesons result from the energetic disintegration stars produced in the high atmosphere. (Nuclear Sci. Abstracts)

SIP U6261

Patton, Clyde P.
METEOROLOGIC ELEMENTS AND SNOWPACK CHARACTERISTICS AT MICROMETEOROLOGICAL PROJECT CENTRAL SIERRA SNOW LABORATORY 1950-51 SEASON. SIPRE Analytical Unit, 13p. tables, graphs, June 1, 1952.
SIPRE files, S-1290

Possible correlations between annual march of atmospheric pressure, wind velocities, cloudiness, insolation, temperature and precipitation were investigated. The relationship between the march of temperature and the depth of the snow pack shows a close correlation between degree-day values and gross change in depth. Characteristics of the snow pack were determined by weekly observations of snow depth and water equivalent supplemented by radioactive snow gage-records from Feb.-April. The snow-pack regime was divided into 6 periods of different meteorological conditions with resultant differences in snow-pack characteristics: a 65-day period of abortive snow-pack formation, a 70-day period of effective snow-pack formation, a 26-day period of settling, a 22-day period of ablation, an 8-day period of reaccumulation, and an 18-day period of final ablation.

SIP U6262

Fraser, D.
ORIFICE-TYPE ICE DETECTOR: PRELIMINARY ICING TUNNEL TESTS OF FUNCTIONING AS ICE DETECTOR, RATE-OF-ICING METER, AND ICING-SEVERITY METER. Lab. Rept. LR-3, Natl. Aeronaut. Establishment, Can. 12p. illus. tables, graphs, diagrs. appendix A, July 1951. 3 refs.
DLC, G.P.R.R.

The performance tests were made at speeds from 100-150 m.p.h. and temperatures from -10° to -18°C. Droplet sizes ranged from 10-35 μ and free water content from 0.5-2.25 gm./cu. m. The standard ice-detectors, used in conjunction with a relay-unit diaphragm sensitive to 0.5 in. water pressure, detects an ice accretion of 0.025-0.030 in. under the various conditions tested. A small increase of sensitivity can be obtained by reducing the size of the pressure holes. A greater increase to about 0.005 in. of ice accretion, can be obtained by reducing the ratio of pressure hole area to the suction hole area, but at the expense of reliable rate-of-icing indication. The instrument is an adequate ice indicator for most purposes, but not for some thermal methods of ice protection.

SIP U6263

Research and Development Board. Com. Geography Geophysics
CONFERENCE ON SNOW AND ICE MAPS. 109p. June 30, 1952. (typed ms.)
SIPRE files, S-1278

Conferees were called for a round-table discussion to acquire and give information on work which had been done, was in progress or was planned along the line of snow and ice maps. Current work and requirements were assessed in a cooperative effort for the benefit of the agencies represented. Notes on the facilities for the study of sea-ice physics at the San Diego Laboratory and in the field at Wales (Alaska) of the U. S. Navy are included.

SIP U6264

Corps of Engineers. South Pacific Division
ADDITIONAL STUDIES OF THE INFLUENCE OF TERRAIN CHARACTERISTICS ON SNOWPACK WATER EQUIVALENT. Snow Investigations, Res. Note, 8p. tables, graphs, June 5, 1953.
SIPRE files

Additional studies of the influence of the topographic characteristics of elevation, slope, aspect, vertical curvature, exposure, and vegetation on the distribution of snow-pack water equivalent in a small mountain watershed tend to bear out previous findings that water equivalent is generally greater at locations of high elevation, flat slope, northerly aspect, and restricted exposure. The water equivalent increases by approximately 1.25-2.50 in./100-ft. increase in elevation, by 0.25-1.00 in./10° deviation of aspect from the south, and approximately decreases by 0.25-0.50 in./1% increase in slope, by 0.5-0.75 in./10° increase in exposure sector. Variations in curvature and vegetation showed no definite effects.

SIP U6265

Ponomarev, V. M.
STUDY OF PERMAFROST FOR MINE CONSTRUCTION. (K voprosu izucheniia vechnoĭ merzloty v sviazi s shakhtnym stroitel'stvom; Text in Russian). p.215-232 incl. graphs, diagrs. (In: Sbornik instruktsiĭ i programmnykh ukazaniĭ po izucheniiu merzlykh gruntov i vechnoĭ merzloty, Moscow-Leningrad, 1938)
DLC, GB648.55.A7, 1938

Permafrost in the Amderma region near the coast of the Kara Sea is studied in relation to mining operations. Permafrost at Amderma is 400 m. deep. The soil temperature varies from -3.6° to -4.8°C at depths of 10 - 216 m. Air temperature curves in mine pits, and insulated drill holes are given. A method of boring holes and measuring the temperature in mine pits and bore holes is described. Temperature is measured at various intervals from 1-10 m. up to a depth of 150-200 m. A series of investigations were made regarding the hydrological and frost conditions, structure of water-bearing horizons and water permeability through the rock strata, surface icings, peat mounds and taliks.

SIP U6266

Birkengof, A. L.
PERMAFROST AND FOREST COVER. (Vechnaia merzlota i lesnoĭ pokrov; Text in Russian). p.233-244. (In: Sbornik instruktsiĭ i programmnykh ukazaniĭ po izucheniiu merzlykh gruntov i vechnoĭ merzloty, Moscow-Leningrad, 1938)
DLC, GB648.55.A7, 1938

The major part of the permafrost region in the USSR lies in the northern and eastern taiga and forest-tundra belts. Forestry is related to the study of permafrost and an integration of the findings of the 2 groups is essential. The preparation of maps, 1:20,000 and 1:500,000 indicating types of vegetation, is recommended. The program calls for data on distribution of vegetation according to various soils, form and density of forest stands, average diam. and height of trees, and type of underbrush in conjunction with the usual data on permafrost.

SIP U6267

Andovskiĭ, N. N.
HYDROLOGY OF INDIGIRKA RIVER. (Materialy po gidrologii reki Indigirki; Text in Russian). Trudy Arkticheskogo Instituta (Leningrad), 105, No. 2:99-124 incl. tables, graphs, 1938. 4 refs.
DLC, G600.L4, v. 105

The thermal regime of the Indigirka River between freeze-up and breakup (early Oct.-late May) is described. The ice cover thickness reaches a maximum of 201 cm. at Pesochnoe and 132 cm. at Vorontsovo during April-May even though the air temperature at Vorontsovo was much lower than at Pesochnoe. Strong winds prevailing in the open tundra region which blow away the snow account for this apparent anomaly. The maximum thickness of the snow cover is only 15 cm. toward the end of the winter. The average diurnal ice-cover accretion is 2 cm. during the first 20 days of ice stoppage and a maximum of 3.5 cm. was observed. Two forms of ice were observed: an opaque formation with a yellowish shade, striated with air voids of 1-100 mm. diam., and a crystalline, transparent formation between floes containing fewer voids of 1-30 mm. diam. A similar crystalline form is found under the ice cover later in the season.

SIP U6268

Rikhter, G. D.
SNOW COVER IMPORTANCE FOR HYDROLOGICAL PROCESSES. (Rol' snezhnogo pokrova v gidrologicheskom protsesse; Text in Russian). Trudy Instituta Geografii, 40:19-23 incl. map, 1948. 13 refs.
DLC, GB236.A4, v. 40

Snow cover is an important factor in river supply. The run-off from snow melt in European Russia averages about 50% of the total run-off, reaching 100% in the southeast. Run-off depends on the depth and structure of the snow cover, the state of soil freezing and the thermal condition of the air during snow melting. A deeper snow cover reduces soil freezing, provides better infiltration of meltwater into the soil, and decreases flood run-off. Snow falling on water surfaces accelerates ice formation in autumn. However, a snow cover in winter acts as an insulator and retards increase in ice-cover thickness. A scant snow cover will induce the formation of permafrost even in regions with annual air temperatures over 0°C.

SIP U6269

Rikhter, G. D.
SNOW COVER IMPORTANCE FOR PROCESSES OF GROUND FORMATION. (Rol' snezhnogo pokrova v protsesse pochvoobrazovaniia; Text in Russian). Trudy Instituta Geografii, 40:35-43 incl. table, maps, 1948. 10 refs.
DLC, GB236.A4, v. 40

A deep snow cover produces conditions in soil different from those of a snow-free soil. Freezing inhibits physicochemical and biological processes in the soil. A snow cover, 1.3-2 m. deep, reduced frost penetration to a few cm. at Khibiny, Vorkuta and other places with severe winters. The formation of humus in chernozem soil of the southeast and the southwest depends on the thermal conditions produced by a snow cover. Maps of European USSR show that soil freezing to depths of 0.1 m. lasts 19 days and more in the northeast to 90 days in the southwest near the Black Sea; freezing to depths of 40 cm. lasts 80 days in the west to 140 days in the east. Soil froze to an average maximum of 45-50 cm. in the west to 150 cm. in the east. Frost penetration was at a maximum in Kazan (160 cm.) and Stalingrad (155 cm.).

SIP U6270

Rikhter, G. D.
INFLUENCE OF SNOW COVER ON VEGETATION. (Vliianie snezhnogo pokrova na rastitel'nost'; Text in Russian). Trudy Instituta Geografii, 40:44-69 incl. illus. tables, diagr. 1948. 49 refs.
DLC, GB236.A4, v. 40

A snow cover protects vegetation from low temperatures and sharp thermal oscillations. A snow cover depth of 20-25 cm. will prevent the freezing of winter crops except in western Siberia where the depth should not be less than 35-45 cm. Any increase in snow density will lessen the protective properties of the snow cover. Snow retention is desirable only in regions with deficient soil moisture. Snow retention in regions with surplus soil moisture as in Shatilovka (Tula province) and near Moscow proved unsatisfactory.

SIP U6271

Demchinskiĭ, B. N.
PROGRAM FOR FIELD AGRICULTURAL EXPERIMENTS IN PERMAFROST REGIONS. (Programma polevykh sel'sko khozĭaĭstvennykh opytov v raĭonakh vechnoĭ merzloty; Text in Russian). p.245-251. (In: Sbornik instruktsiĭ i programmnykh ukazaniĭ po izucheniiu merzlykh gruntov i vechnoĭ merzloty, Moscow-Leningrad, 1938)
DLC, GB648.55.A7, 1938

Planned organization of farming on large, unused permafrost areas of the USSR is suggested. A program for introducing methods of soil investigations requires maps on soil, soil relief, and permafrost relief. Such a program calls for data on atmospheric pressure, precipitation, wind velocity, humidity, clouds, and soil temperatures. Frost control measures include the determination of the effects of frozen soil on plant life and soil composition, and studies on artificial snow retention and root penetration.

SIP U6272

[Bucher, Edwin]
ROLBA-JEEP SNOW-CLEARING AND SHIFTING MACHINE TYPE 11. (Rolba-Jeep-Schneeschleuder Type 11; Text in German with French and English titles). Zürich, Aktiengesellschaft Rolba, [n.d.], 3p. illus. diagrs.
SIPRE files, S-1267

The essential components of the machine are a cutting drum, ejector housing, 2-stage gear for the cutting drive, cardan-shaft, coupling levers for jeep front-wheels, reduction gear, chain reduction gear, and an auxiliary engine (Ford V-8). The cutting-ejecting mechanism is easily attached or detached from the jeep. Snow may be ejected 12-15 m. or 30-40 m. either to the left or right, and the machine may be used as a loader when a swivel chute is mounted on the ejector. The drum can be raised up to 25 cm. above the ground, permitting speeds of 25 km./hr. The machine removes snow at the rate of 480 tons/hr.

SIP U6273

de Quervain, M.
CONTINUATION OF EXPERIMENTS OF WINTER 1943/44. (Fortsetzung von Untersuchungen des Winters 1943/44; Text in German). Eidg. Inst. f. Schnee- u. Lawinenforschung, Mitt. 8p. illus. graphs, Sept. 1, 1945. (typed ms.)
SIPRE files, S-1386

Experiments concerning the metamorphism of the new snow crystal, the mutual influence of various grain fractions, and snow metamorphism by the effect of a temperature gradient are described. The loss of substance of an enclosed snow crystal during metamorphism was determined by using a microbalance. A linear loss of weight of 0.03 mg./day was determined. The use of paraffin oil to preserve the snow crystals at -10°C is described, and com-

pared with the metamorphism of snow crystals in a saturated vapor atmosphere. Photomicrographs depicting the developmental stages of a snow crystal are included. Grain-size distribution curves were obtained by means of a modified screen analysis. This method is insufficiently accurate to determine with certainty small effects. The modified experimental conditions for producing snow metamorphism by means of a temperature gradient are described.

SIP U6274

Palmer, Andrew H.
SNOW AND RAILWAY TRANSPORTATION. Monthly Weather Rev. (U. S.), 47:698-699, illus. Oct. 1919. 3 refs.
DLC, QC983.A2, v. 47

Snowfall presents a difficult problem to the railroads crossing the Cascade Mountains of Oreg. and Wash. and the Sierra Nevada of Calif. Snow which accumulates to depths of a few ft. is removed from the tracks by a locomotive push plow or a rotary plow. The tending of switches, signal apparatus, and turntables requires hand labor. Snowsheds are built where snow accumulates to 25-30 ft. or more. The sheds are built to sustain snow 16 ft. deep. Deeper snow is shoveled off by hand to prevent collapse of the shed. The danger of snowslides is always present.

SIP U6275

Wherry, Edgar T.
SNOW CRYSTALS FROM THE CRYSTALLOGRAPHIC STANDPOINT. Monthly Weather Rev. (U. S.), 48:29-31 incl. illus. diagrs. Jan. 1920. 3 refs.
DLC, QC983.A2, v. 48

Crystallographic relations evidenced by photographs of snow crystals are discussed. Snow and ice crystals belong to one of the hemimorphic classes of the trigonal system of crystallization; ice belongs to the ditrigonal pyramidal class, like the mineral tourmaline, because it does not rotate the plane of polarized light. Three axes of development lie in a plane, crossing each other at 60° angles, and the fourth axis or the unique axis is perpendicular to this plane and of 3-fold symmetry. Opposite ends of the unique axis are crystallographically unlike. The majority of snow crystals show no sign of trigonal symmetry. Snow crystals present a highly perfect hexagonal symmetry because the trigonal nucleus is vanishingly small and the secondary growth very rapid.

SIP U6276

Horton, Robert E.
COMPARISON OF SNOW-BOARD AND RAINGAGE-CAN MEASUREMENTS OF SNOWFALL. Monthly Weather Rev. (U. S.), 48:88-89, illus. table, graph, Feb. 1920.
DLC, QC983.A2, v. 48

The rain-gage overflow can and the snow board were used in eastern N. Y. to compare the accuracy of measurements of snowfall by 2 different methods commonly used. The snow board consisted of a 16-in. square piece of beaver board covered with cotton flannel, was cleaned after each reading, dried and laid on the surface of the newly fallen snow. The average depth of snowfall as determined by the water equivalent for the snow board was 10% greater than that determined from measurements with the rain gage overflow can.

SIP U6277

Gunn, Ross, Wayne C. Hall and Gilbert D. Kinzer
ARMY-NAVY PRECIPITATION-STATIC PROJECT. PT. I. THE PRECIPITATION-STATIC INTERFERENCE PROBLEM AND METHODS FOR ITS INVESTIGATION. Proc. I.R.E. 34:156-161 incl. illus. April 1946. 11 refs.
DLC, TK5700.I6, v. 34, pt. 1

The blocking of navigational radio communication between aircraft and ground station and aircraft to aircraft is encountered in flight areas of dry snow clouds or ice-crystals, melting snow and rain. The frictional or triboelectric charging process that may exceed 500,000 v. is caused by the striking snow sliding along the body surface of the aircraft. Investigations and results of coordinated tests show that the charging rate depends upon the chemical nature of the surface. The neutralizing surfaces developed give no practical military solution to the problem since the neutralizing properties of the surfaces are too easily modified nor do they suppress the corona as produced by exogenous electric fields.

SIP U6278

Stimmel, Ronald G. and others
ARMY-NAVY PRECIPITATION-STATIC PROJECT. PT. 3. ELECTRIFICATION OF AIRCRAFT FLYING IN PRECIPITATION AREAS. Proc. I.R.E. 34:167-177 incl. illus. graphs, April 1946. 5 refs.
DLC, TK5700.I6, v. 34, pt. 1

The charging characteristics of an airplane flying through dry snow are given and correlated with quantitative ground data. The dependence of charging process upon the ambient temperature and the possibility of neutralizing the charging by special surfaces is demonstrated. The discharge characteristics of the aircraft are evaluated in terms of the charge carried away by the engine-exhaust ions and by corona discharge. It is concluded that under severe precipitation conditions most of the accumulated charge is carried away by the corona processes. Difference between unipolar or autogenous electrification and bipolar or exogenous charging are emphasized. Both types produce serious radio interference and require different treatments for their mitigation. (Authors' abstract)

SIP U6279

Rikhter, G. D.
THE SNOW COVER INFLUENCE ON CLIMATE. (Vliîanie snezhnogo pokrova na klimat; Text in Russian). Trudy Instituta Geografii, 40:10-18 incl. tables, 1948. 18 refs.
DLC, GB236.A4, v. 40

The investigations initiated by A. I. Voeĭkov in 1889 and continued by others show that the snow cover influence is important enough to warrant the term, snow climate. The snow cover interrupts the gaseous exchange between the soil and the atmosphere, prevents deep soil freezing and thus promotes biochemical processes in the soil during winter. Snow cover with an albedo up to 89% (Slutsk)-94% (Arctic) produces a peculiar temperature distribution near the ground. The temperature of a snow-cover surface is usually lower than that of a snow-free surface and the lower air layers. Temperature inversions and greater stability of anticyclones over snow-covered surfaces are normal. The rough surface of snow effects more evaporation, which in connection with the low temperatures produces a higher relative humidity. The thermal conditions over a snow cover also cause advective fogs during the spring. (See also SIP U2510)

SIP U6280

Rühl, P.
SUGGESTION FOR AVALANCHE DEFENSES. (Anregung zu Lawinenverbauungen; Text in German). Schweiz. Bauztg. 69:114, March 3, 1951. 1 ref.
DLC, TA3.S41, v. 69

The experimental investigation of trapezoidal pilings, 8-10 m. high, with the tip facing downhill and suitably spaced in the path of avalanches is suggested. These structures would retain or break the energy of avalanches better than the existing low retaining walls.

SIP U6281

Inst. Eng. Res. Univ. Calif.
[SNOW CHARACTERISTICS]. Progress Rept. for the year June 27, 1952 to June 27, 1953. 73p. incl. illus. tables, graphs, diagrs. appendices I, II, June 27, 1953. 12 refs.
SIPRE files

A heated cavity reflectometer used to determine the spectral reflectivity and reflectance of various substances is described. Its use is limited to the study of samples not affected by temperature rise and is not adaptable to the study of snow, ice or permafrost. A paraboloid reflectometer, now under construction, and described will permit the measurement of reflectance without heating the sample and can be enclosed in a controlled temperature cabinet to test materials which must remain below freezing. The 2-radiometer laboratory method and the emissivity meter used in the field to measure surface emissivity at or near ambient temperature are described and relevant equations are presented. A solarimeter used to measure the transmission of solar radiation into the snow pack at any level and an albedometer used to measure the heat gains and losses due to solar radiation at the surface of the snow pack are described. The physical properties affecting transmission are discussed.

SIP U6282

Berger, Carl and Jack Combs
ICE PHYSICS PROGRAM. Commonwealth Eng. Co. Ohio, Quart. Rept. for period Nov. 1952-Jan. 1953, 53p. incl. illus. tables, [1953]. 7 refs. (Contract AF 33 [616]-127)
ASTIA, AD13821

The nature of nucleation and crystallization of ice and the parameters affecting them are studied. Comparisons of various contaminants that influence nucleation temperature were made possible through the use of a method described in a previous report which increases the amount of supercooling of water below 0°C by eliminating the air-water interface. Contaminants decrease the energy needed to change from the liquid to the solid phase by providing a nucleus in the solid form. The effects of contaminants on nucleation temperatures are tabulated. The similarity of the nucleation particle of insoluble contaminants to the hexagonal structure of ice increases the activity of the nucleating agent. All contaminants except CO_2 produce an elevation of the nucleation temperature of supercooled water. Preliminary experimental data show a rapid increase in crystallization velocity with decreasing temperature. Sudden cooling does not change ice crystal structures to the cubic form. Accepted factual data of a hexagonal ice-α-predominant between 0° and -8°C, and a rhombohedral form β found at lower temperatures is refuted. Data gathered to determine the parameters affecting ice crystal growth on the surface and in the liquid are presented.

SIP U6283

Rikhter, G. D.
THE SNOW COVER AND GEOMORPHOLOGICAL PROCESSES. (Snezhnyĭ pokrov i geomorfologicheskie protsessy; Text in Russian). Trudy Instituta Geografii, 40:24-34 incl. illus. 1948. 26 refs.
DLC, GB236.A4, v. 40

Matthes (1900) considered snow cover as an agent of relief formation. Other investigators observed nivation processes not only in mountainous regions but also over plains. An irregular distribution of the snow cover caused differential soil freezing, frost heaving, and peat mounds in tundra. Meltwaters induce intensive soil erosion. A total of 60-98% of the annual amount of soil particles carried by most rivers of European USSR and 5-50% in mountain rivers are received through meltwaters. Sporadic summer snow fields on protected slopes contribute to the asymmetrical forms of valleys. Landslides activated by snow meltwater and snow avalanches are frequent phenomena changing the relief forms.

SIP U6284

Rikhter, G. D.
SNOW COVER OVER THE TERRITORY OF THE USSR. (Snezhnyĭ pokrov na territorii SSSR; Text in Russian). Trudy Instituta Geografii, 40:86-169 incl. tables, graphs, maps, diagrs. 1948. 62 refs.
DLC, GB236.A4, v. 40

The accuracy of the snow-cover data of 1892-1914 is discussed. The average dates of the appearance and disappearance of the snow cover and data on mean maximum snow depth over the USSR are presented on maps. These data and others on snow stability and snow melting form the basis for plans to present such information according to regions. Snow conditions in each of the 7 zones are described in terms of mean and extreme dates of the appearance and disappearance of the snow cover, duration of a deep cover, and ranges of snow cover depth and density.

SIP U6285

Pavlovskiĭ, M. A.
WINTER CONDENSATION OF MOISTURE IN THE UPPER LAYERS OF PEAT-PODZOLIC AND DARK SOILS (UNDER DIFFERENT SURFACE COVER AND VARIOUS DEPTHS OF CULTIVATION). (Zimnĭaia kondensat͡siia vlagi v verkhnikh gorizontakh dernovo-podzolistykh i temnot͡svetnykh pochv (pod razlichnymi ugodiiami i pri razlichnoĭ glubine obrabotki; Text in Russian). Pochvovedenie, 47:784-793 incl. tables, 1952. 11 refs.
DLC, S590.P6, v. 47

Soil moisture and freezing, as well as level of underground waters, were studied during the winter of 1950-51 at the experimental farm of the Academy of Sciences near Moscow. Frost penetration reached 80-102 cm. in open fields and 17-20 cm. in forests. Moisture content increased in the upper 30-40 cm. during winter and decreased in the lower layers. Condensation occurred in the surface layers of openly located parts of the field during frosty weather. The moisture content decreased in the forest in layers deeper than 10 cm. throughout the winter.

SIP U6286

Dadykin, V. P.
SOME EXPERIMENTS WITH MOISTURE MIGRATION IN FROZEN SOIL. (Nekotorye opyty po peredvizheniiu vody v merzloĭ pochve; Text in Russian). Pochvovedenie, 47:794-891 incl. tables, graph, 1952. 5 refs.
DLC, S590.P6, v. 47

Water mobility in frozen soil was studied experimentally. Tests with osmotic methods proved unsatisfactory and the method of seed weighing was applied. Vetch seeds were weighed, placed in a chamber with frozen soil at -0.3°, -2°, -5°C for 3 and more days, and then weighed again. The experiments showed that water migrates in frozen soil due to osmotic pressure. Swelling decreased in seeds that were first kept at a temperature of -0.3°C, and then removed to a chamber at a temperature of -5°C. Seeds increased in weight when placed in ice. It is assumed that seeds absorb water vapor sublimated from ice.

SIP U6287

Vasil'ev, I. S.
CONDITIONS OF SOIL FREEZING AND THAWING NEAR MOSCOW. (Promerzanie i ottaivanie pochvy v usloviiakh Podmoskov'ia; Text in Russian). Pochvovedenie, 47:769-783 incl. tables, graphs, 1952. 7 refs.
DLC, S590.P6, v. 47

Soil freezing and thawing, and moisture migration in field and forest soils were investigated near Moscow during the winter of 1950-51. Frost penetration reached 33 cm. in wooded areas with a 26-cm. snow cover and 70 cm. (with a 25-cm. snow cover) to 145 cm. (with an irregular snow cover averaging 8 cm.) in fields. The speed of soil freezing in fields was about 23 mm./day without a snow cover, and 7-13 mm./day with a snow cover. Soil freezing in wooded areas reached 14 mm. and 4 mm./day under snow-free and snow-cover conditions respectively. Intensive moisture migration to the freezing soil layers accompanied the slow process of soil freezing. Soil thawing occurred after snowmelting and was chiefly produced by incoming heat from the surface soil layers.

SIP U6288

Gorodkov, B. N.
SOILS OF THE TUNDRA PLAIN IN USSR. Pochvovedenie, 25, No. 4:87-104 incl. illus. tables, map, 1930. 36 refs.
DLC, S590.P6, v. 25

The tundra zone extends through northern Europe and Asia and is determined by an arctic climate of short cold summers and long severe winters. Tundra appears in elevated areas as well as in the plains. Hillocks characterize tundra over areas of sporadic permafrost. Tundra exists in the plains over drained soil with or without a snow cover, swampy areas, and flood valleys. Mosses are the principal vegetative cover which grow over a dark brown peat-humus. Transition soils containing iron compounds are directly below the humus. The soils of the tundra have a high moisture content. Polygonal soil formations are common.

SIP U6289

Hobbs, William Herbert
THE GLACIERS OF MOUNTAIN AND CONTINENT. Z. Gletscherkunde, 22:1-19 incl. illus. diagrs. March 1935. 10 refs.
DLC, QE575.Z4, v. 22

Mountain and continental glaciers represent the beginning and culmination of the cycle of glaciation; ice-cap glaciers form the intermediate stage. Mountain glaciers are of moderate size and are nourished

by ascending moist air. They have gravitational downward flow throughout and are held within rock containers. Continental glaciers are vast, having a flat domed surface, and are nourished by snow and rime from descending air currents. Their internal gravitational movement is restricted to the marginal zone. Icecaps are intermediate in size but approach that of mountain glaciers. The dome of icecaps is less flat than that of continental glaciers. Smaller icecaps are nourished by ascending currents; larger icecaps develop a local centrifugal surface-air circulation.

SIP U6290

Mercanton, P. L.
THE CRYOCINEMETER OF THE SWISS GLACIER COMMISSION. (Le cryocinémètre de la Commission Helvétique des Glaciers; Text in French). Z. Gletscherkunde, 22:163-171 incl. illus. tables, March 1935. (Notes)
DLC, QE575.Z4, v. 22

The gage and supplementary tools are described. The instrument must be placed on firm ground in the direction of the glacier flow to measure the total movement. Measurements of the Rhone glacier from 1923-1933 indicate a correlation between the frontal flow velocity and the glacier length. The glacier retreat of 11 m. in 1923 corresponded to a daily glacier velocity of 13.3 cm.; the retreat of 20 m. in 1930 to a daily velocity of 9.7 cm., and the advance of 5.5 m. in 1927 to a daily velocity of 20.6 cm. Certain irregularities are attributed to local causes. Measurements of glaciers of different flow characteristics are recommended. Values obtained for different years are comparable if the measurements are taken at the same time of the year.

SIP U6291

Corps of Engineers. South Pacific Division
RADIATION IN FOREST AT WILLAMETTE BASIN SNOW LABORATORY. Snow Investigations, Res. Note, 17p. tables, graphs, diagrs. June 1, 1953. 12 refs.
SIPRE files

Observations were made from July 8-15, 1952 under clear, warm and calm weather conditions to determine the effect of forest cover upon radiant heat exchange. Measurements made on four 1000 to 2000-sq. ft. snow patches show that the long-wave radiation is made toward the snow and averages 0.11 ly./min. for an average forest temperature of 70°F. A formula for estimating net long-wave radiation as a function of forest cover and temperature was derived. All wave radiant heat transfer toward the snow is maximum in the open in clear weather, drops to a minimum under moderate forest cover and increases with denser cover accounting for the persistence of snow patches in small clearings during the melt season.

SIP U6292

Corps of Engineers. South Pacific Division
HEAT EXCHANGE AND MELT OF LATE-SEASON SNOW PATCHES IN HEAVY FOREST. Snow Investigations, Res. Note, 19p. illus. tables, graphs, appendix, May 15, 1953.
SIPRE files

A continuously melting snow patch in a dense coniferous forest was observed for 5 days of clear calm weather in mid-July and the results are analyzed. Each heat supply component is evaluated from measurements of long-wave and short-wave radiation, of condensation and of air temperature close to the snow and then expressed in terms of air temperature and air moisture at normal height measurement. Almost 55% of the snow melt is due to long-wave radiation, less than 15% to short-wave radiation, about 20% to convective-conductive heat transfer from the air, and about 15% to latent heat of condensation. The calculated amount of melt is expressed by the summation of the heat component contributions. The calculated melt was about 8% greater than the measured melt, most of the difference occurring during the last 36 hr. It is possible to express nearly 75% of the heat exchange as a function of the air temperature only. Forest cover affects the short wave markedly, wind and turbulence affect the sensible heat and latent heat of condensation.

SIP U6293

Corps of Engineers. South Pacific Division
PRELIMINARY UNIT-GRAPH STUDIES MANN CREEK WILLAMETTE BASIN SNOW LABORATORY. Snow Investigations, Res. Note, 5p. table, graphs, map, June 15, 1953.
SIPRE files

Unit hydrographs for routing of surface and subsurface flow of Mann Creek, Willamette Basin Snow Laboratory (Oreg.) are derived, primarily with a view to application of the subsurface-flow unit graph in studies of the melting of relatively shallow snow packs in that creek basin. The adequacy of the 2 unit graphs adopted is tested by reproduction of 3 rain-flood hydrographs. (Author's abstract)

SIP U6294

Best, A. C.
OCCURRENCE OF HIGH RATES OF ICE ACCRETION ON AIRCRAFT. Professional Notes Meteorological Office (London), 7, No. 6, Prof. Notes No. 106:3-22 incl. tables, graphs, 1952. 14 refs.
DLC, Unbound periodical

The probability of an aircraft encountering various concentrations of supercooled water in well-developed convective clouds at low latitudes was studied. Mensurements of liquid-water content in strongly convective clouds at high altitudes compare favorably with computed theoretical values. The effect of drop diameter on the temperature at which drops freeze spontaneously is discussed. Isopleths of the rate of

SIP U6299

Stremme
BEGINNING OF WINTER AND SNOW CONDITIONS IN THE FORESTED CARPATHIAN MOUNTAINS AT THE BOUNDARY CREST HUNGARY - GALICIA AND AT THE POLONIA MASSIF NEAR VOLOCZ. (Eintritt des Winters und Schnee verhältnisse in den Waldkarpaten am Grenzkamm Ungarn - Galizien und am Polonia - Massiv bei Volocz; Text in German). Höherer Pionierführer 14, Wehrgeologenstelle (25), Az. 39 Geol. 10g Nr. 276/44, 2p. table, map, Sept. 30, 1944. (typed ms.)
DWB, File No. 2743

The beginning dates of winter at elevations from 500 m.-1000 m. as well as those of freezing temperatures, and snowdrifts are indicated. A map showing areas of snow cornice and avalanche formations is included. The duration of winter is from mid-Nov. to mid-April, and the deepest snow cover is attained at the beginning of Feb. Mean daily temperatures below 0°C exist from the end of Nov. Normal minimum temperatures are near -20°C. A coherent snow cover forms in mid-Nov. The mean snow depth is 0.50 m. with maximum depths of 1.50 m. Drifts begin in mid-Jan. and last to mid-March. Snow cornices prevail on slopes above the forest line (1100 m.-1200 m.)

SIP U6300

Thost, E.
WEATHER CONDITIONS IN THE CAUCASUS REGION DURING FALL AND WINTER. (Die Witterungsverhältnisse im Kaukasusgebiet während des Herbstes und Winters; Text in German). Armeeoberkommando 17, Wehrgeologenstelle 14, 3p. tables, Sept. 3, 1942. (typed ms.)
DWB, File No. 2743

Mean, maximum, minimum and absolute monthly maximum and minimum air temperatures, dates of first and last frost, precipitation amounts, number of days with precipitation and snow cover, and beginning and end of the snow cover are tabulated for various Caucasian regions. The number of days with snowfall varies from 20 days near the southeastern portion of the Black Sea to 40 days in the northern Ukraine. The average snow-cover depth in southern Russia is 10-15 cm.

SIP U6301

Bendel, Ludwig
ROAD SUBGRADES AND GROUND FROST. (Strassenuntergrund und Bodenfrost; Text in German). p.431-444 incl. illus. tables, graphs, diagrs. (In: Ingenieurgeologie, by Ludwig Bendel, Pt. II, Wien, Springer-Verlag, 1948)
DLC, QE33.B4, Pt. II

Frost-heave intensity is dependent on the physical properties of the soil, the chemical nature of the soil, and climatic conditions. A tabulation of 13 physical, chemical and climatological frost criteria and their originators is given, and each criterion is discussed. The effects of ground frost are analyzed including frost heaving under various pavements and the effects of thaw weather. Measures for preventing frost heaves on roads are outlined.

SIP U6302

Haefeli, R.
SNOW, AVALANCHES, FIRN AND GLACIERS. (Schnee, Lawinen, Firn und Gletscher; Text in German). p.663-735 incl. illus. tables, graphs, diagrs. (In: Ingenieurgeologie, by Ludwig Bendel, Pt. II, Wien, Springer-Verlag, 1948). [300] refs.
DLC, QE33.B4, Pt. II

The formation, deposition, and metamorphism of snow are discussed. The physical properties of snow, including density, porosity, conductivity, plasticity, viscosity, and strength properties are presented, and special methods for examining the snow cover are outlined. The formation and classification of avalanches, and avalanche defensive measures are presented. Snow pressures upon structural elements are calculated and preventive measures against creep pressure are outlined. Fundamental concepts of glaciers, firn and glacier movement, and glacier variations are analyzed.

SIP U6303

Gavrilov, S. E.
AREAL CLASSIFICATION OF RAILROADS AS RELATED TO SNOWSTORM AND FROST CHARACTERISTICS. (Kharakteristika i klassifikatsiia dorog po metelîam i morozam; Text in Russian). p.6-12, 212-219 incl. tables. (In: Snezhnye zanosy i bor'ba s nimi, by S. E. Gavrilov, Moscow, Transzheldorizdat, 1945)
DLC, TF542.G38, 1945

Snowstorm and frost data for the period 1933-1943 are tabulated and used in an areal classification of railroad networks in the USSR. Snowstorms produce the maximum difficulties on the Tomsk and Karaganda railroads, where the average number of days with snowstorms is 49 and 42 respectively. The fewest days with snowstorms (5-12 days) occurred along railroads of the Baltic States, Far East and Turkestan. The railroad routes of Eastern Siberia, Western Siberia and the Northern Urals are subjected to very low winter temperatures. The average number of days with temperatures below -30°C varied between 12-61 days.

SIP U6304

Gavrilov, S. E.
PROTECTION OF RAILROADS FROM SNOWDRIFTS. (Zashchita zheleznodorozhnogo puti ot zanosov; Text in Russian). p.26-105 incl. illus. tables, graphs, diagrs. (In: Snezhnye zanosy i bor'ba s nimi, by S. E. Gavrilov, Moscow, Transzheldorizdat, 1945)
DLC, TF542.G38, 1945

Three degrees of snowdrift susceptibility for railroads are given. The most dangerous regions are in deep valleys, station areas and along slopes. Railroads elevated up to 0.65 m. in level areas and to 1.0 m. on slopes are least susceptible to drifts. The effectiveness of various protective measures is presented.

SIP U6305

Gavrilov, S. E.
CAUSES OF SNOWDRIFT FORMATIONS AND TECHNICAL INSTRUCTIONS FOR THEIR PREVENTION AND REMOVAL FROM RAILROADS AND STATIONS. (Prichiny obrazovaniîa snezhnykh zanosov i tekhnicheskie ukazaniîa po preduprezhdeniîû i likvidaîii ikh na peregonakh i stanîiîakh; Text in Russian). p.105-211 incl. illus. tables, graphs, diagrs. (In: Snezhnye zanosy i bor'ba s nimi, by S. E. Gavrilov, Moscow, Transzheldorizdat, 1945)
DLC, TF542.G38, 1945

Methods of snow removal, snowplows and snowmelters used by the railroads of the USSR are described. Electric heaters for railroad switches are only used experimentally. Snowmelters burning wood melt 6-8 cu. m. and coal 8-18 cu. m. of snow/hr. The oil-burning Burov snowmelter handles up to 20 cu. m./hr.

SIP U6306

Khachaturov, T. S. and A. P. Mikheev
RAILROAD OPERATIONS IN THE USSR UNDER WINTER CONDITIONS. (O rabote zheleznykh dorog SSSR v zimnikh usloviîakh; Text in Russian). Tekhnika Zheleznykh Dorog, 6, No. 9:1-8 incl. illus. diagrs. 1947.
DLC, TF4.M613, v. 6

Investigations made during 1946 by the All-Union Railroad Research Institute are reviewed. The most difficult railroad operations occur in northern USSR, Ural, Siberia, the Far East and Kazakhstan. The most favorable conditions for winter operations are in the Western, Southwestern, Caucasian and Central Asia Railroad Districts. About 36% of the entire network is subject to drifting snow. Snow removal from railroads during 1946-47 totaled 156 million cu. m.

SIP U6307

Efimov, I. T.
ON THE PROBLEM OF DEPENDENCE OF BUILDING FOUNDATION DEPTH ON SOIL FREEZING. (K voprosu o glubine zalozheniîa fundamentov zdaniî v zavisimosti ot promerzaniîa gruntov; Text in Russian). Tekhnika Zheleznykh Dorog, 6, No. 10:26, 1947. 3 refs.
DLC, TF4.M613, v. 6

The study by M. N. Gol'dshteĭn is criticized. The theoretical considerations are correct, but the suggested formula cannot be applied for calculations of foundation depths. (See also SIP U3901)

SIP U6308

[Khachaturov, T. S.]
ON THE PROBLEM OF DEPENDENCE OF BUILDING FOUNDATION DEPTH ON SOIL FREEZING. (K voprosu o glubine zalozheniîa fundamentov zdaniî v zavisimosti ot promerzaniîa gruntov; Text in Russian). Tekhnika Zheleznykh Dorog, 6, No. 12:22-23, 1947. 4 refs.
DLC, TF4.M613, v. 6

The study by M. N. Gol'dshteĭn and his formula for calculating the depth of building foundations are discussed. Gol'dshteĭn's contention that the depth of building foundation must be calculated from the depth at which the ice formation in the soil ceases is accepted by many. Present standards provide for exaggerated values for foundation depths, but even scant experimental data indicate the impracticability of the suggested formula. (See also SIP U3901, U5802, U5804, U6307)

SIP U6309

Reid, C. R.
ICE-TROUBLE REMEDIES IN HYDRO-ELECTRIC PLANTS. Power, 72:728-730 incl. illus. diagrs. Nov. 4, 1930.
DLC, TJ1.P7, v. 72

The methods of using steam, hot water, electric heating, compressed air, and electric lights to keep sluice gates, flashboards, rackbars, headgates, penstocks, surge tanks, and waterwheels in operating condition in cold climates are discussed. Heaters of 4 to 5-kw. capacity will keep roller trains free from ice. Daily application of steam amounting to 110,000 lb./month will keep two 20 x 40-ft. sluice gates free of ice.

SIP U6310

Hess, P. M.
AIR BUBBLER SYSTEM MAINTAINS OPEN CHANNEL IN ICE SHEET. Elec. World, 139, No. 10: 106-108 incl. illus. graph, March 9, 1953.
DLC, TK1.E5, v. 139

An air bubbler system is used at the Safe Harbor (Pa.) hydroelectric plant to prevent the formation of sheet ice in front of the gates and on both sides of the skimmer wall. The installation consists of a 1000-ft. length of 1.5- and 1.0-in. galvanized steel pipe laid on the bottom of the pond which is about 50 ft. deep at the dam. Graded orifices varying in drill size from No. 35-38 were placed every 20 ft. on the pipe which was connected to a 100-lb. air header and control orifice through a 2-in. rubber hose. Silting has not interfered with its effectiveness during a 3-yr. operation.

SIP U6311

Garrigue, Hubert, Robert Poyard and Pierre Hautefeuille
RIME FORMATIONS ON ELECTRIC LINES. (Sur le givrage des lignes électriques; Text in French). Compt. Rend. 228:593-594, Feb. 14, 1949. 1 ref.
DLC, Q46.A14, v. 228

Studies of ice formation on experimental lines on the summit of Puy de Dome (France) are presented. The lines consist of five 200-m. span lines of dual wire 26 mm. in diam. in a horizontal or vertical plane, one 200-m. span hollow cable of 45-mm. diam., and 2 dual wire lines of 20-m. span, one of which is subjected to 120,000 v. at 50 cycles. Electric recorders register contacts between the 2 strands of the dual lines. Rime forms faster on the 20-m. dual line under 120,000 v. at 50 cycles than on the neutral one, on the windward wire of the horizontal plane dual wire, and on the upper wire of the vertical plane dual wire. Lateral rime forms when the wind hits the wire from the side. The rime is aerodynamically unstable and drops soon after forming. Parallel rime forms when the wind is parallel to the line and may reach a diam. of 45 cm. before dropping. Contact between the strands of the 200-m. dual lines occurred immediately before the wires broke indicating that the breakage is due to shock waves in the cables resulting from the rime fall.

SIP U6312

Harry, A.
ICE ACTION ON HYDROELECTRIC PLANT INSTALLATIONS IN RUNNING WATERS. (Action de la glace sur les constructions et les parties mécaniques des installations hydroélectriques en eaux courantes; Text in French). Revue Gén. Électricité, 42:555-571, 593-604 incl. illus. tables, graphs, map, diagrs. Oct. 30, Nov. 6, 1937.
DLC, TK2.R35, v. 42

Stagnant and slowly running waters freeze from the top down. Waters flowing at 0.8 m./sec. or more freeze along a colloidal pattern throughout the water body forming frazil and anchor ice. Ice formation and countermeasures taken at specified hydroelectric plants on the various river basins of Switzerland, mainly during the severe 1928-29 winter are discussed. The best general protection was obtained by accelerating the formation of an ice-cover on the intake channel. Generally, protection must be geared to the particular characteristics of the river involved.

SIP U6313

Sturgis, Samuel D., Jr.
ARCTIC ENGINEERING KNOW-HOW GETS ACID TEST AT THULE. Civil Eng. 23:585-589 incl. illus. diagrs. Sept. 1953.
DLC, TA1.C452, v. 23

The engineering problems related to the construction of a modern airbase at Thule (Greenland) include permafrost conditions, the selection of a suitable prefabricated building material, water supply, and the construction of the runway. Ventilation, insulation and their combination were used to maintain the thermal balance; ventilation under the foundations of boilers, the combination method under frame buildings. Structures were built with panels of 3.5-in. Fiberglas insulation between 2 sheets of Al-clad, 0.25-in. plywood. Crescent Lake, 6 mi. from the base, was equipped with an earth dam to provide water supply. The water, chlorinated and filtered at the lake, will be transported to the base by a fleet of heated tank trucks. The binder course for the runway was made from aggregate produced from local stream gravel. Crushed and screened diorite rock was used for the wearing course.

SIP U6314

Hettich, A. and H. Steinmetz
PIEZOELECTRIC EXPERIMENTS ACCORDING TO THE METHOD OF GIEBE AND SCHEIBE. (Piezoelektrische Versuche nach der Methode von Giebe und Scheibe; Text in German). Z. Physik, 76:688-706 incl. tables, 1932. [20] refs.
DLC, QC1.Z44, v. 76

A large number of organic and inorganic materials were qualitatively tested for piezoelectricity according to the high frequency method. The results indicate certain general and special regularities concerning the distribution of the piezoelectric or non-piezoelectric character. The dipole molecule H_2O appears to be the cause for piezoelectricity in a number of crystal hydrates. Ice was found to be non-piezoelectric according to an earlier experiment by Hettich and Schleede. This result was confirmed by repeating the experiment under favorable conditions.

SIP U6315

Reinhard
ON THE FREEZING AND THAWING OF BOGS IN WHITE RUSSIA (RUTHENIA). (Über das Zufrieren und Auftauen der Moore in Weissruthenien; Text in German). Reichsamt f. Wetterdienst (Luftwaffe), Klimainstitut Minsk, 6p. incl. tables, [1943]. 2 refs. (typed ms.)
DWB, File No. 2743

Bogs and swamps cover 18% of the total area of White Russia. The number of bogs, area, mean depth, and volume of peat deposits are tabulated for individual areas. The time of formation of an ice cover on the bogs varies considerably and is dependent upon weather conditions, surface structure, vegetative cover, and the amount and flow speed of the ground water. Ice cover formation is aided by the absence of a snow cover, which also limits frost penetration. All bogs and swamps freeze in White Russia, generally 1-2 weeks after the daily mean temperature decreases below 0°C, usually during the second half of Nov. Frost penetrates 15-20 cm. in high moorlands and 30-40 cm. in low-lying bogs and marshes. Frost penetration is determined by

an empirical equation as a function of mean snow-cover depth and the sum of the daily mean air temperatures below 0°C.. Thawing of bogs occurs in 3 ways: solely from bottom to top until the snow cover is melted, a combination of the former with thawing from the top by melting of the snow cover, and exclusively from the top after complete melting of the snow cover.

SIP U6316

Brand
GROUND FROST DEPTH AND CONSTRUCTION OF POSITIONS DURING THE SECOND HALF OF THE WINTER 1943/44. (Bodenfrosttiefe und Stellungsbau in der 2. Hälfte des Winters 1943/44; Text in German). Wehrgeologenstelle (2) bei Höh. Pionier-Kdo. 2, Az.: 39 Geol. 10g Nr. 163/44, 2p. incl. graph, Feb. 14, 1944. (typed ms.)
DWB, File No. 2743

A comparison of the monthly mean air temperatures for winter 1943-44 with the long-period monthly mean indicates an unusually mild winter in Minsk. The snow-cover depth is considerably below average, and frost which penetrated to 0.3-0.4 m. in snow-free ground in mid-Jan. was thawed at the end of Jan. Since then, frost has penetrated to 10-15 cm. in snow-covered areas and 20-25 cm. in snow-free areas. The hardness of the frozen ground is considerable as a result of the high water saturation in the upper layers due to repeated thawing. The approximate frost penetration speed in loamy soil of normal water content is 1 cm./day, so that only a maximum penetration of 0.5 m. is expected in open terrain.

SIP U6317

Brand
GROUND FROST AND THE CONSTRUCTION OF POSITIONS. (Bodenfrost und Stellungsbau; Text in German). Wehrgeologenstelle (2) bei Höh. Pi. Kdo. 2, Az.: 39 Geol. 10g Nr. 194/43 geh. 3p. incl. table, Dec. 10, 1943. (typed ms.)
DWB, File No. 2743

Frost penetration is dependent upon soil moisture and composition in addition to the air temperature. Penetration is greatest in sandy, dry soils; it is average in loamy soils, and is least in moorlands. The hardness of frozen soil is greatest for loam in an open, elevated area. Frost penetration data for 1942-43 are tabulated for various soils at various locations in White Russia. The values range from 0.40 m. in moorlands to 1.30 m. in sand.

SIP U6318

Reinhard
PRECIPITATION REPORT FOR THE WEEK OF JAN. 22-29, 1944. (Niederschlagswochenmeldung vom 22.1.-29.1. 1944; Text in German). Reichsamt f. Wetterdienst (Luftwaffe). Klimainstitut Minsk, Tgb. Nr. 80/44, 1p. incl. tables, Jan. 30, 1944. (typed ms.)
DWB, File No. 2743

Precipitation amounts for Jan. 23-Jan. 29, 1944 and amounts for Jan. 1-Jan. 29, 1944 in percent of the Jan. mean, snow cover depths, and mean snow cover depths are tabulated for various stations in White Russia. A wide variation in snow-cover depth was ascertained near Minsk. Frost penetrated to 40 cm. in soils not covered by snow, and 0-15 cm. in snow-covered soils according to snow depth (10-30 cm.). The ice thickness of the Svisloch River 17 km. above Minsk was 15 cm. at the edge and ice-free at the center on Jan. 25.

SIP U6319

Germany. Reichsamt für Wetterdienst (Luftwaffe). Klima-Institut Minsk
PRECIPITATION REPORT FOR THE WEEK OF JAN. 16-22, 1944. (Niederschlagswochenmeldung vom 16.1.-22.1. 1944; Text in German). Tgb. Nr. 52/44, 1p. incl. tables, Jan. 23, 1944. (typed ms.)
DWB, File No. 2743

Precipitation amounts for Jan. 16-Jan. 22, 1944 and amounts for Jan. 1-Jan. 22, 1944 in percent of the Jan. mean, snow cover depths, and mean snow cover depths are tabulated for various stations in White Russia. The depth of frost penetration in Minsk decreased from 20-10 cm. in loamy soil without vegetation. The ice thickness of the Svisloch River 17 km. above Minsk was 5 cm. in the center and 15 cm. at the edge on Jan. 20.

SIP U6320

Brand
GROUND FROST AND RIVER ICE MEASUREMENTS. (Bodenfrost und Flusseismessungen; Text in German). Wehrgeologenstelle (2) bei Höh. Pionier-Kdo. 2, Az.: 39 Geol. 10g Nr. 709/43, 1p. Dec. 31, 1943. (typed ms.)
DWB, File No. 2743

Frost penetrated 10-12 cm. in sandy soil with a vegetative cover, to 15 cm. in plowed sandy soil, and to 10 cm. in loamy soil in the Borisov region (USSR) by Dec. 30, 1943. The ice thickness on standing waters was 20-25 cm. and 8-12 cm. on the Beresina River during this period. Shipping is impossible below Borisov.

SIP U6321

Germany. Reichsamt für Wetterdienst (Luftwaffe). Klima-Institut Minsk
WHITE RUSSIA (RUTHENIA). MEAN FROST DEPTH OF THE SOIL. OBSERVATION SERIES OF GROUND TEMPERATURES. (Weissruthenien. Mittlere Frosttiefe des Bodens. Beobachtungsreihen von Erdbodentemperaturen; Text in German). 21 tables, [1943]. (typed ms.)
DWB, File No. 2743

Monthly mean, maximum, and minimum soil temperatures at depths of 0.05 m.-3.20 m. are tabulated for Gorkii, Minsk, Novoe Korolevo, and Orsha

for individual years ranging from 1931-1940. Mean, maximum, and minimum values of frost penetration from Oct.-May 1895-1915 for 5 stations are tabulated.

SIP U6322

Siegfried
ICE CONDITIONS ON THE SOUTHERN BUG RIVER. (Eisverhältnisse des südl. Bug; Text in German). Wehrgeologenstelle 12, Az.: 39 Geol. 10g Br. B. Nr. 166/43, 2p. table, graphs, Dec. 27, 1943. (typed ms.)
DWB, File No. 2743

Daily mean air temperatures are plotted against ice thicknesses for Jan. 1, 1942-April 11, 1942 and for Dec. 2, 1942-March 21, 1943. The average ice thickness is 30-40 cm., and is usually attained in Dec. and beginning Jan. The load carrying capacity of the ice cover is dependent on the uniform freezing of the ice. The load carrying capacity of various ice thicknesses for various military loads is tabulated.

SIP U6323

GROUND PROFILES OF A SNOW TREATMENT EXPERIMENT NEAR MOSCOW, 1926. (Bodenprofile eines Schneebearbeitungsversuches bei Moskau, 1926; Text in German). Supplements I and II to W. Geol. St. (2), Az.: 39 Geol. 10g Nr. 208/44, 2p. diagrs. 1944.
DWB, File No. 2743

The thawing process of frozen ground is depicted in a field, one area of which was subjected to snow treatment and the other area was left untreated. The snow in the treated area was heaped into rows 1 m. high and 1 m. wide with 1-m. wide snow-free strips between each row. The soil in the treated field was completely thawed after 9 days, as compared to 15 days in the untreated field with a homogeneous snow cover 80 cm. deep. Water movement in soil in both areas of the field is depicted for the period April-Aug.

SIP U6324

Brand
[THE THAWING SPEED OF VARIOUS SOILS] (Text in German). [Wehrgeologenstelle (2) bei Höh. Pi. Kdo. 2 Az.: 39 Geol. 10g]. [8]p. incl. graphs, diagr. 1944. (typed ms.)
DWB, File No. 2743

Soil composition and moisture determine the speed of thawing, but have no influence on the time of complete thaw. Time is exclusively dependent on the snow-cover depth. The time of complete thaw for various areas in White Russia and for various soils with different snow-cover depths and ground covers is plotted. A graph indicating relative ground moisture in winter and its dependence on the frozen ground is included. The soil begins to dry immediately after thawing. The influence of snow-cover depth on the length of the mud period is indicated, and methods for limiting the thaw period are outlined. Possible errors introduced in measuring frost penetration depth are cited.

SIP U6325

Griffiths, Ezer
THE ICE CALORIMETER. WITH REMARKS ON THE CONSTANCY OF THE DENSITY OF ICE. Proc. Phys. Soc.(London), 26:1-15 incl. tables, diagr. discussion, Dec. 15, 1913. 6 refs.
DLC, QC1.P5, v. 26

The constant of Bunsen's ice calorimeter was redetermined by an electrical method and found to be 15.486 mg. Hg/cal. Small variations found in ice density determinations for different ice samples may be due to the presence of occluded water in the ice samples examined or to an amorphous modification cementing the ice crystals together, but not to allotropic crystallization. The value of the latent heat of fusion of ice calculated from ice density may be erroneous.

SIP U6326

Baker, F. S.
SOME FIELD EXPERIMENTS ON EVAPORATION FROM SNOW SURFACES. Monthly Weather Rev. (U. S.), 45:363-366 incl. table, graphs, July 1917. 3 refs.
DLC, QC983.A2, v. 45

Evaporation was measured at the Utah Forest Exp. Sta. in Manti National Park in 1915-16 by the periodic weighing of a hyaline glass jar filled with snow and sunk in the snow, its top flush with the snow level. Air temperature, wind velocity and humidity were measured concurrently. Evaporation varies closely with temperature, deviations occurring during changes in wind velocity or humidity. The determination of mean hourly diurnal and nocturnal evaporation and the mean diurnal and nocturnal temperature show the influence of higher night humidity and daytime insolation. The total evaporation for the season was about 3 in. or approximately 14% of 21.91 in., the water equivalent of the snowfall.

SIP U6327

Alps, H. F. and O. H. Hammonds
LAYER MEASUREMENTS OF SNOW ON GROUND NEAR SUMMIT, CALIF. Monthly Weather Rev. (U. S.), 48:519-520 incl. table, Sept. 1920.
DLC, QC983.A2, v. 48

Reports of 4 snow-depth measurements during 1919-20 show that the original 39-in. thick Dec. layer was reduced to 35 in. in March, 29 in. in April and 11 in. in May. Densities of foot layer measurements based on records of 4 seasons from 1916-1920 are tabulated. The density of the ground layer varied from 34 in Dec. to 55 in May.

SIP U6328

Buchanan, J. Y.
IN AND AROUND THE MORTERATSCH GLACIER: A STUDY IN THE NATURAL HISTORY OF ICE. Scot. Geographical Mag. 28:169-180, illus. April 1912. 10 refs.
DLC, G1.S43, v. 28

A glacier is at its m.p. throughout its mass during the summer and retains this temperature in winter except for a superficial shell of small thickness. The melting temperature of ice depends on the medium in which it melts and on the pressure to which it is subjected. The interior of the glacier is a compact granular mass of primary ice, blue in color. The granular surfaces are moistened with water derived from the ice of the grain. Solar radiation is absorbed by the intergranular liquid with heat production which slightly melts the ice. Part of the space is replaced by air, giving a white appearance to the secondary ice of the outside layer. Comparisons between the Mergelin Sea with its floating portions of glaciers and the Antarctic Ocean suggest an explanation of the higher water temperature in the vicinity of icebergs.

SIP U6329

Henry, Alfred J.
THE DENSITY OF SNOW...Monthly Weather Rev. (U. S.), 45:102-113 incl. illus. tables, graphs, March 1917. 27 refs.
DLC, QC983.A2, v. 45

The water equivalent of fresh snow, temperature and density relations, the density of old, new and old glacial snow, and the evaporation of snow are discussed. A brief account by Alciatore on the factors which determined the growth, settling, and final disappearance of the snow cover in the Tahoe Basin in 1915-16 is included. The density of fresh snow is least in mid-winter and greatest in late spring, and generally increases with temperature. The density of snow cover is fairly uniform for similar weather conditions. Densities are higher in the northeastern U. S. than in the W. and SW. Loss of a snow cover by evaporation is probably small and often balanced by gains from condensation. Accurate measurements of snow evaporation should be made in western U. S.

SIP U6330

Dennison, D. M.
THE CRYSTAL STRUCTURE OF ICE. Phys. Rev. 17:20-22 incl. table, Jan. 1921. 3 refs.
DLC, QC1.P4, v. 17

X-ray photographs of ice using Hull's method disclose 12 clearly defined lines whose position indicate that the lattice of an ice crystal corresponds to a hexagonal close-packed arrangement of molecules, consisting of 2 sets of interpenetrating triangular prisms with sides 4.52 Å. and height 7.32 Å. The axial ratio for the ice molecule appears to be 1.62 instead of 1.633 as for close packed spheres, showing a flattening by 0.8% in the direction of the hexagonal axis. This lattice is similar to that of the Mg atom but the differences in relative intensity between the lines of the 2 X-ray patterns suggest a difference in shape. $(H_2O)_2$ or H_4O_2 is the formula obtained for the ice molecule from the density of ice and the dimensions of the lattice. (Author's abstract)

SIP U6331

Germany. Reichsamt für Wetterdienst (Luftwaffe). Klimaabteilung
BEGINNING OF CONTINUOUS GROUND FROST IN THE AREA BETWEEN EAST PRUSSIA AND CARPATHIANS. (Beginn ständigen Bodenfrostes im Raum zwischen Ostpreussen und Karpaten; Text in German). 5p. incl. maps, Oct. 1944. (typed ms.)
DWB, File No. 2735

Maps showing the mean values of the beginning dates of continuous ground frost for 1930-1938, and values for the winters 1934-35 and 1936-37 are presented. The average beginning date is between the end of Nov. and the second half of Dec. The maps of individual years were selected to depict typical examples of periodical displacements in beginning dates.

SIP U6332

Lemke, Erich
REPORT ON THE ESTABLISHMENT OF BOG STATIONS NEAR PINSK. (Bericht über die Einrichtung von Moorstationen bei Pinsk; Text in German). Wehrgeologenstelle 23, Az. 39 Geol. 10g Nr. 31/44 with supplements 1-6, 2p. tables, map, Jan. 19, 1944. (typed ms.)
DWB, File No. 2735

Three stations were selected to make regular measurements of frost penetration in the Pinsk (Poland) bogs. Another station for measuring the ice thickness of the Strumien River was established to compare frost penetration into the bogs with ice thickness of open waters. A map indicating the location of the stations is included. Frost penetration, snow cover depth, and ground water table data for each bog station, and a tabulation of ice thicknesses on the Pina River from Dec. 1, 1943-Feb. 25, 1944 including a description of the ice, air and water temperatures are given.

SIP U6333

Hodgkins, Jordan A.
PERMAFROST: A BIBLIOGRAPHY FROM SOVIET SOURCES. Geography Dept. Syracuse U. 24p. map, June 1953.
SIPRE files, S-2288

The bibliography consists of 279 articles on permafrost. The first 242 entries are alphabetized by author and 37 more items appear in an addendum in no particular order. The regions in the USSR with ground temperatures at 0°C, above -1.5°C, from -5° to -1.5°C, and below -5°C at a depth between 10-15 m. are mapped.

SIP U6334

Hallberg, Sten
DIFFERENT TYPES OF SNOW FENCES AND THEIR FUNCTION. (Olika snöskärmstyper och deras verkningssätt; Text in Swedish). Svenska Väginst. Medd. 67:5-8 incl. illus. 1943.
DPR, TE4650.S8A3, v. 67

Snow fences are classified according to their function into 2 main types, the accumulating and the deflecting. Each group is further classified as stationary or movable, open or closed fences. The accumulating type is discussed. Open fences are characterized by their aperture ratio, which is the relation of space between the slats expressed in percentage of the total surface. An aperture ratio of 50% was the most satisfactory. Wire fences of the horizontally open type include emergency fences made of straw bands, twigs and branches that were used with good results during World War II.

SIP U6335

Hallberg, Sten
TYPES OF SNOW FENCES USED IN SWEDEN. (Snöskärmstyper som anvandas i Sverige; Text in Swedish). Svenska Väginst. Medd. 67:8-38 incl. illus. tables, 1943.
DPR, TE4650.S8A3, v. 67

Detailed field studies were designed to investigate suitable construction and time utilization in erecting and dismantling snow fences. The study included vertical and inclined designs of vertical and horizontal slat fences, both commercial and home-made. Wood materials, shape, anchorage, trussings, extension mechanisms and locks are described and clearly illustrated. Each type of fence was tested in 40-m. lengths exposed to easterly winds. Extended time studies of erection are suggested in order to save time and money. Snow shields of German design were not satisfactory.

SIP U6336

Hallberg, Sten
SOME VIEWPOINTS CONCERNING THE CONSTRUCTION OF SNOW FENCES; A COMPARISON BETWEEN THE WIRE FENCE AND THE CHAIN FENCE. (Några synpunkter rörande konstruktionen av snöskärmar; jamförelse mellan trådstaket och kättingstaket; Text in Swedish). Svenska Väginst. Medd. 67:39-45 incl. illus. tables, 1943.
DPR, TE4650.S8A3, v. 67

The stability of a snow fence against wind pressure depends on the anchor posts. This resistance capacity was calculated as a function of the horizontal wind pressure at 1-m. height expressed in kg./m. fence. The results are presented for 11 different styles of anchor posts. Material, dimensions, shape, height over free ground and depth into sand and clay ground are given and the difference in resistance capacity in these soil types are stated in kg. It was found that trussed poles had better resistance than those equipped with snubber plates. A good fence must be of minimum weight and volume and easy to handle. The wire fence meets all these requirements but lacks durability. A simple method for storing board fences is described.

SIP U6337

Hallberg, Sten
FOREIGN INVESTIGATIONS ON THE CAPACITY OF SNOW FENCES TO ACCUMULATE SNOW. (Utländska undersökningar av snöskärmars förmåga att samla snö; Text in Swedish). Svenska Väginst. Medd. 67:46-51 incl. illus. tables, graph, 1943. 3 refs.
DPR, TE4650.S8A3, v. 67

Finlay's (USA) scale model experiments are reviewed and summarized. Nökkentved's (Denmark) measurements of the wind speed taken 25 cm. off the ground at different distances behind snow fences are described. The results are tabulated as a function of distance on the percentage of reduction of wind speed. Danish and German experimental results with vertical and inclined fences indicate the significance of aperture ratio. Fences with an aperture ratio of 50% gave best results. It is concluded that aerodynamic scale model experiments may give indications as to the construction of snow fences but only full-scale field tests give reliable results.

SIP U6338

Hallberg, Sten
MEASUREMENTS OF WIND MOVEMENT AT SNOW FENCES. (Mätningar av vindens rörelse vid snöskärmar; Text in Swedish). Svenska Väginst. Medd. 67:52-65 incl. illus. tables, graphs, diagrs. 1943.
DPR, TE4650.S8A3, v. 67

Full-scale tests were conducted during 1941-42 on the ice of Mälaren Lake to determine wind velocity at snow fences of different construction and angle of inclination. Four-m. sections were erected in 32-m. lengths and exposed to the full impact of wind at 4 and 8 sec./m. The wind direction was measured at 72 points with a vertical net of silk streamers fastened to horizontal lines. Streamer movement was recorded photographically and by drawings. Wind speed was obtained at 32 points with anemometers. The experimental results with 23 fences of various types and designs are tabulated. The effects of aperture ratio, angle of inclination, and snow shields on snowdrift formation are discussed. No definite conclusions are drawn.

SIP U6339

Dzerdzeevskiĭ, B. L.
ATMOSPHERIC CIRCULATION OVER THE CENTRAL POLAR BASIN. (Tsirkuliatsiia atmosfery v Tsentral'nom Poliarnom Basseĭne; Text in Russian). Trudy Dreĭfuŝshcheĭ Stantsii "Severnyĭ Polius", 2:64-190, 427-484 incl. illus. tables, graphs, maps, diagrs. [1945]. 74 refs.
DLC, G630.R8E4, v. 2

Meteorological conditions near the North Pole are

discussed and the investigations published since 1855 are reviewed. The observations on the drifting ice field, North Pole, and polar region stations for the period of 1937-38 are analyzed and used for classifying weather types. The data confirmed Sverdrup's conclusions about the presence of a permanent, cool air layer over the ice cover of polar regions. The thickness of such layers is determined by the surface and incoming air masses. Inasmuch as the snow cover through reflection and insulation prevents heat transfer from the ocean to the air, the thickness of the cool air layer near the snow surface becomes stable during the polar night. This stability is reduced in summer through decreases in the snow and ice cover, the appearance of open water, and incoming radiation. The large amount of heat used for snow-melting often increases the thickness of the cool air layer near the surface to 1-1.5 km.

SIP U6340

Fedorov, E. K. and E. T. Krenkel'
RESULTS OF METEOROLOGICAL OBSERVATIONS. (Rezul'taty meteorologicheskikh nablîudeniĭ; Tables and notes in Russian). Trudy Dreĭfuîushcheĭ Stanîsii "Svernyĭ Poliîus", 2:202-423, illus. [1945].
DLC, G630.R8E4, v. 2

Daily meteorological observations taken on the drifting ice field, North Pole, are tabulated. Data covered the period, May 22, 1937-Feb. 19, 1938, during which the field changed its location from 89°27' N. lat. to 70°45' N. lat. The maximum temperature was 1.6°C in July, and the minimum -43.8°C in Jan. Temperatures above the f.p. were noted from June 11-Aug. 26 when intensive snow-melting occurred. The maximum duration of the frost-free period was 4 days in July. Snow precipitation was observed throughout the entire period. The maximum number of days with snowfall in summer months was 19-21 days. Changes in weather were frequently accompanied with rime, which formed at temperatures as low as -31°C.

SIP U6341

Bucher, Edwin
TECHNICAL CONSIDERATIONS ON THE PROBLEM OF AVALANCHE FORMATION. (Technische Überlegungen zum Problem der Lawinenbildung; Text in German). Berge der Welt, 1:131-141 incl. graphs, diagr. 1946.
DLC, G505.B4, v. 1

An analysis of the stability conditions within a snow cover is made. The critical point, or rupture, is attained when tension caused by settling and creep is equal to the value of the snow-cover strength. The variables, location and time, are taken as parameters; each is used separately as a constant in a stability diagram. Pressure zones within a snow cover are relatively safe, whereas tensile and shear zones are conducive to avalanche formation. The influence of snow-cover depth, metamorphism, temperature, and radiation on the snow-cover strength is graphically indicated. Practical hints for recognizing avalanche-susceptible zones on the basis of terrain configuration are given.

SIP U6342

[Peyriguey, Jacques]
INFLUENCE OF SNOW ON SPRING VEGETATION. (Influence de la neige sur le développement de la végétation au printemps; Text in French). La Nature, 48:179-180 incl. tables, graphs, April 10, 1920.
DLC, Q2.N2, v. 48

The daily temperatures of the air 20 cm. above the ground and of snow at 10- and 20-cm. depths are tabulated from Feb.-April. Temperature variations are much greater in the air than in the snow indicating the beneficial insulation of the snow cover. Evaluation of the N compounds added to the soil by 551 mm. of combined rain and snow at Montsouris amounts to 14.860 kg. of N/ha./yr. A combined 1621.7 mm. of rain and snow enriched the soil at Mont-Aigonal by 43.736 kg. of N compounds per ha. for the 6 month period from Dec. to May.

SIP U6343

Bergeron, T.
SUGGESTION FOR HYDROMETEOR DEFINITIONS. (Vorschlag zu Hydrometeor-Definitionen; Text in German). Secreteriat de l'organisation meteorologique internationale, Climatological Commission, No. 20:90-94, 1935. 1 ref.
DLC, QC851.I47, No. 20

The symbols, English and French equivalents, and definitions of 27 hydrometeors are presented. Included are ice grains, granular snow, ice needles, snow drift, hoarfrost, rime, glazed frost, and hail.

SIP U6344

Bauer, C. A. and J. Geo. Premo, Jr.
DETERMINATION OF AMBIENT GROUND TEMPERATURES. Elec. Light and Power, 31, No. 11: 133-137 incl. illus. table, graphs, Sept. 1953.
DLC, TK1.E213, v. 31

A formula using air temperature data provides an accurate method to calculate ground temperatures. The instruments used to measure ground temperatures at various depths are described. Ground temperatures follow the periodic characteristics of the air temperatures but the time of minimum and maximum is increasingly delayed and the amplitude decreased with increasing depths. At each depth the periodic variation remains sinusoidal. This periodicity was used in developing a formula for the determination of ambient ground temperatures from the base temperature and the air temperature amplitude. Ground temperatures measured for 5 successive years at 2-ft. and 9.5-ft. depths are plotted against time. The calculated values agree with the measured ones within 1°C.

SIP U6345

Malʃûkov, N. P. and M. E. Meĭtus
SOIL FREEZING AND PERMAFROST. (Promerzanie gruntov i vechnaʃâ merzlota; Text in Russian). p. 197-207 incl. tables, maps, diagrs. (In: Osnovy Inzhenernoĭ Geologii, by N. P. Malʃûkov and M. E. Meĭtus, Moscow, Dorizdat, 1947). 3 refs.
DLC, QE22.M3, 1947

Mean frost penetration data for the USSR are given. The thickness of the active layer will vary locally, depending on the nature of the vegetative cover. The formation of icings, thermokarst and buried ice and their influence on foundations are discussed.

SIP U6346

Smirnov, P. S.
WINTER MILITARY OPERATIONS. (Boevye deĭstviʃâ zimoĭ; Text in Russian). Moscow, Voenizdat, 1939, 106p. incl. tables, diagrs.
DLC, U167.W5S5, 1939

Winter attack and defense operations are analyzed. The effects of low temperatures on the human body and on munitions as well as the importance of snow cover are discussed. Additional protective clothing against freezing is necessary at temperatures below -10°C. Deep snow cover hinders the mobility of units. Infantry and cars become immobile at snow depths of 30 cm. and over, amphibian tanks at depths over 40 cm., and power tanks at depths over 70 cm. Snow-compacted roads and ski units are possible effective measures in regions of deep snow cover.

SIP U6347

Sjölund, Åke
ROAD MAINTENANCE IN WINTER--AN UNDERESTIMATED PROBLEM?.(Vâghållning vintertid--ett underskatt problem?; Text in Swedish). Pansar Teknik Underhåll, 18, No. 3:20-24 incl. illus. March 1949.
DLC, U4.P34, v. 18

The plow equipment of various units and detachments of the Swedish army is described as ineffective. The best plow is the 5-ton caterpillar-driven, front and side-wing plow that handles a 120-cm. wet and heavy snow cover. Experiments to develop an effective ice rake are under way and when successful the 3 problems, snow removal, terrain plowing and road opening may be solved.

SIP U6348

SKI MOUNTINGS FOR THE AJS AND THE TRIUMPH ARMY MOTORCYCLES. (Montering av skiöor till AJS och Triumph armémotorcyklar; Text in Swedish). Pansar Teknik Underhåll, 19, No. 2:24 incl. illus. 1949.
DLC, U4.P34, v. 19

The ski is fastened to the motorcycle frame with 2 movable spring-supported clamps extended to steel pipes that are fastened to the ski, one in front and one at the rear.

SIP U6349

Lomtadze, V. D.
METHODS FOR LABORATORY INVESTIGATION OF PHYSICO-MECHANICAL PROPERTIES OF SANDY AND CLAYEY GROUND. (Metody laboratornykh issledovaniĭ fiziko-mekhanicheskikh svoĭstv peschanykh i glinistykh gruntov; Text in Russian). Moscow, Gosgeolizdat, 1952, 234p. incl. tables, graphs, diagrs. appendix. [80] refs.
DLC, TA710.L59, 1952

The methods and apparatus used for engineering and geological investigations of soil are described. A classification of ground, sampling techniques and methods for determining those physical and mechanical properties applicable to frozen ground are given.

SIP U6350

Dobbin, R. L.
ELECTRICAL THAWING OF WATER MAINS. Can. Engr. 72, No. 12:10-11 incl. diagr. March 23, 1937.
DLC, TA1.C2, v. 72

The principal methods of electrical thawing are described. Standard distribution transformers consist of two 10 kv.-a. transformers connected to the primary distribution circuits. Special low-voltage transformers for connection to the house service wires vary in size from 2.5-5 kv.-a. giving 11-22 v. on the secondary side and current values from 200-800 amp. Engine-driven generator sets are used primarily where primary current is not available. Precautions to be taken when thawing water pipes are outlined.

SIP U6351

Golovkov, M. P.
SOME CRYSTALLOGENIC PHENOMENA RELATED TO ICING IN NAVIGATION. (O nekotorykh ʃavleniʃâkh kristallogenezisa v sviʃazi s problemoĭ obledeneniʃâ v moreplavanii; Text in Russian with German summary). Izvestiʃâ Akademii Nauk SSSR, Seriʃâ Geograficheskaʃâ i Geofizicheskaʃâ, 5:355-360 incl. diagrs. 1941. 15 refs.
DLC, AS262.A6246, v. 5

Sea-water icing occurs on cooled ship surfaces as well as glaze or rime. Such icing may become quite thick during stormy weather. Anchor and frazil ice adhering to submerged parts of a ship are dangerous and hinder movement. Alum crystals were used to study ice adhesion processes. Most of the alum crystals formed octahedrons. Some of the crystals were polyhedrons of a cubic-octahedral structure. The cubic faces of these crystals adhered to the glass surface; the octahedral faces did not adhere to glass. Experiments showed that crystal adhesion depends on the direction of the crystal lattice. Ice

crystals possess varying degrees of adhesion. Snowflakes have no adhesion, but hoarfrost crystals are highly adhesive.

SIP U6352

Fakidov, I. G.
SEA ICE. (Morskoĭ led; Text in Russian). Sovetskaîa Arktika, 2, No. 11:95-98 incl. illus. 1936.
DLC, G600.S6, v. 2

Sea ice forms in 2 distinct layers under calm conditions. The upper layer is several cm. thick and is composed of horizontal sheets of ice, and the lower layer consists of vertical ice needles. A turbulent sea is often covered with round or oval disks called pancake ice. The salt-content variations with age and depth are discussed. NaCl crystallizes on the ice surface under certain conditions and handicaps skiers and dogs when mixed with snow. Unequal expansion of ice results in fissures, and wind pressure and solifluction produce deformations. The melting of sea ice is briefly described. The properties of sea ice are studied to ensure optimum construction of new ice breakers.

SIP U6353

Department of the Air Force
ANTARCTICA. AFM 200-30, 171p. incl. illus. table, graph, maps, Aug. 1953. [80] refs.
ASTIA

A series of 343 keys for use as subject keys for areas inundated by continental glaciers, regional keys for Antartica or analogous keys for Greenland are presented. Each key consists of a predominantly vertical or oblique airphotograph and an associated written analysis in the form of caption, annotation, scale, and diagnostic feature. A bibliography of about 40 antarctic bibliographies and a similar number of articles is included.

SIP U6354

Schreiber, Paul
STUDIES ON GROUND HEAT AND SNOW COVER. (Studien über Erdbodenwärme und Schneedecke; Text in German). Chemnitz, Königl. sächsisches meteorologisches Institut, 1905, 94p. incl. tables, graphs, diagrs.
DLC, QC907.S4, 1905

The results of experimental heat flow studies in the ground and studies of snow-cover properties are presented. Concepts and explanations of heat flow in solid bodies, and a survey of conductivity coefficients and water contents of the most important materials are included. The snow cover and the effect of frost on snow-free ground are discussed. The water content, density and specific volume of the snow cover are analyzed on the basis of various experiments conducted at different locations. Heat flow in snow and the effect of the snow cover on the temperature conditions of the ground and the air are studied. Formulas are derived for frost penetration into soils and water, and experiments on the behavior of an artificially made snow deposit are described.

SIP U6355

Havlíček, F. I.
THE STRUCTURE OF WATER. (Zur Struktur des Wassers; Text in German). Z. Physik, 121:495-500 incl. diagr. 1943. 9 refs.
DLC, QC1.Z44, v. 121

Assumed associations in water are examined on the basis of a model of the crystal structure of ice according to Bragg, Barnes, Bernal and Fowler, and the Debye water molecule. A lattice of the space group D_{6h}^{4} is set up, and a model for the associations is obtained, the main structural element being a hexagon. The formation of this hexagon is shown by construction of a simple association from triangular Debye water molecules. The internal energy as a function of the difference between the real and ideal medium is calculated from the binding factors, and the behavior of water is explained on the basis of the models.

SIP U6356

Vereshchagin, G. Fŭ.
THE PRESENT METHODS OF THERMAL REGIME FORECASTING IN LAKES AND WATER RESERVOIRS. (O sovremennykh metodakh prognoza termicheskogo rezhima ozer i vodokhranilishch; Text in Russian with German summary). Izvestiîa Akademii Nauk SSSR, Seriîa Geograficheskaîa i Geofizicheskaîa, 5:377-392 incl. tables, 1941. 35 refs.
DLC, AS262.A6246, v. 5

The methods used in forecasting temperature in water reservoirs with or without an ice cover are analyzed. The influences of the radiational water cooling, solar radiation, thermal conductivity of ice and snow on the thermal regime of water reservoirs are studied in detail. Prior forecasting methods are sufficiently accurate only for the thermal regime in small, ice-covered water reservoirs. The interrelations between the thermal regime of the water and the factors influencing it require investigation.

SIP U6357

Bates, Charles C. and Gordon G. Lill
CURRENT NAVAL RESEARCH IN LAND AND SEA ICE. Trans. Am. Geophysl. Union, 31:278-281 incl. diagr. April 1950. 5 refs.
DLC, QE500.A6, v. 31

Naval research under way on land and sea ice to realize the maximum use from the Arctic Ocean includes: growth, movement, and disintegration of ice in polar regions; behavior of ice flces to determine their possible use as a means of transport; the development of an arctic research laboratory at Point

Barrow (Alaska); the study of the physical properties of Alaskan glaciers and ice crystal measurements in relation to glacier movement; thermal studies of permafrost; techniques for quantitative investigations of sea ice patterned after those used in soil mechanics; the development of an ice mechanics field test kit for general use, a parallel to the snow kit; a functional glossary of ice terminology and codes for reporting ice conditions.

SIP U6358

Myers, Vance A.
FREQUENCY VARIATION OF SNOW DEPTHS IN THE MISSOURI AND UPPER MISSISSIPPI BASINS. Monthly Weather Rev. (U. S.), 81:162 incl. table, June 1953.
DLC, QC983.A2, v. 81

Daily accumulated depths of snow on ground were taken from W. B. Form 1001 and plotted against day of the year. A smooth curve enveloping all the points, and 2 smooth curves from 10-day units enveloping 90% and 95% of the points were drawn. These curves were used to tabulate the depth of snow on the ground exceeded 10% and 5% of the time. The maximum snow depth which occurred during the years considered is included in the table.

SIP U6359

Riis, Axel
SANDING SLIPPERY ROADS. (Spridning av grus i halt före; Text in Swedish). Svenska Vägförening. Tid. 20:111-122 incl. illus. April 1933.
DPR, Unclassed periodical

The sanding equipment used in Denmark including manual, semi-mechanical and motorized sanders are described. The effect of quality of the sand used is briefly discussed along with a cost estimate of sanding the Danish road network.

SIP U6360

Murelius, G.
A NOVEL SNOWBANK CUTTER. (En ny snökantskärare; Text in Swedish). Svenska Vägförening. Tid. 20:368-369 incl. illus. Oct. 1933.
DPR, Unclassed periodical

A steel wing for cutting snowbanks, 0.25 to 1 m. high, is described. The wing is mounted on a sledge, towed by a truck, and can be mechanically regulated both vertically and horizontally. The cutter was satisfactory even on poor rural roads.

SIP U6361

Larsen, Thor
RUT CLEANERS ON TRUCKS USED FOR SNOW REMOVAL. (Sporrensere på brøitebilene; Text in Norwegian). Svenska Vägförening. Tid. 20:478-480 incl. illus. diagr. Dec. 1933.
DPR, Unclassed periodical

The driving wheels of a truck pushing a front plow may be subject to spinning in loose snow. Curved steelplates attached ahead of the wheels push the loose snow into the center of the road for removal on the return trip. Initial field tests showed that the spring arrangement can be improved.

SIP U6362

Wolff, A.
WINTER HIGHWAYS ON ICE. (Vintervägar på is; Text in Swedish). Svenska Vägförening. Tid. 27: 268-282 incl. illus. graph, diagrs. Dec. 1940.
DPR, Unclassed periodical

The maintenance of ice roads for motor traffic over sea, lakes and rivers in Sweden is discussed. Motor traffic starts on the dual highway when the ice is 15 cm. thick. One side of the road is used for 2-way traffic until the other side developes a thicker ice cover. The snow removed by plowing becomes a closed snow fence along the highway. Snowbanks are utilized for molding the ice quays on the weakest spots, where ice meets land. The banks are stabilized by repeated sprinkling and freezing. Board and timber quays replace the ice quays when they become too weak to maintain traffic through May or until the ferries can operate. The bearing capacity of ice for all kinds of motor vehicles is given. The occurrence of pockets in the ice that melt from below results from warmer ground water from below the sea bottom.

SIP U6363

Beskow, Gunnar
INSULATION AS A COUNTERMEASURE AGAINST ROAD BREAKUP AND FROST HEAVING. (Om isoleringsåtgärder mot tjälskott och tjäskjutning; Text in Swedish). Svenska Vägförening. Tid. 17:281-293 incl. illus. table, diagrs. June 1930.
DPR, Unclassed periodical

It is a common practice to place an insulating layer at certain depths in the roadbed to reduce or eliminate capillarity. The 3 insulators used satisfactorily in Sweden are peat moss, sand, and twigs, each covered with a tar roofing material to shut off the rise of capillary water. These methods are discussed and the properties of the materials involved are tabulated.

SIP U6364

DETERMINATION OF WATER SUPPLY FROM SNOW FIELDS. Eng. News Record, 83:766-768 incl. tables, diagr. Oct. 23, 1919. 2 refs.
DLC, TA1.E6, v. 83

A table for estimating the water content for snow of given depths is presented. It is one of many representing the average condition of the snow at different periods of the year, at different altitudes in both open and wooded country, based on several thousand measurements taken over a period of 7 yr. A

table comparing calculated water content with measured values obtained from sampling devices gives an indication of the degree of accuracy to be expected.

SIP U6365

Horton, R. E.
EVAPORATION FROM SNOW AND ERRORS OF RAIN GAGE WHEN USED TO CATCH SNOWFALL. Monthly Weather Rev. (U. S.), 42:99-100 incl. table, diagr. Feb. 1914.
DLC, QC983.A2, v. 42

Wet snow occurring at the beginning of a snowstorm stuck to the outside of the rain-gage can, gradually building up a barrier which greatly deflected later snow. Only 0.43 in. in water equivalent entered the gage while 1.41 in. actually fell on the ground. Depths of snow on the ground and water equivalent over a period of 8 days following the snowstorm were tabulated and the total loss and daily loss determined. Since little or no melting occurred the loss was due to evaporation. An average monthly evaporation of about 1 in. is indicated for fairly cold, clear weather without heavy winds.

SIP U6366

Kost, Wolfgang
ON THE CRYSTALLIZATION SPEED AND PHASE BOUNDARY TEMPERATURE OF WATER. (Über die Kristallisationsgeschwindigkeit und Phasengrenztemperatur des Wassers; Text in German). Z. Elektrochem. 57:431-438 incl. graphs, diagrs. 1953. 10 refs.
DLC, TP250.Z6, v. 57

Supercooling of the phase boundary during ice formation was qualitatively shown by measuring the water temperature as a function of time. The solidification temperature of pure water during freezing was measured on a vertically arranged Cu plate by means of thermoelements according to a new method. The measured supercooling temperatures are a function of the freezing speed and were found to be between -0.02° and -0.11°C at freezing speeds of 0.2-2 mm./min. Other experiments in which water in capillary tubes was first supercooled in a cooling bath, and then forced to crystallize by nucleation with an ice crystal, showed a relationship between bath temperature and linear crystallization speed. A comparison of the results from the plate and the capillaries yields a good agreement. It is concluded that independent of the type of heat withdrawal from the phase boundary, a clear relationship exists between freezing temperature and speed.

SIP U6367

Timofeevskiĭ, N.
ICE COVER OF YENISEY BAY. (Ledi͡anoĭ pokrov Enisei͡skogo zaliva; Text in Russian). Izvestii͡a Vsesoi͡uznogo Geograficheskogo Obshchestva, 57: 23-32 incl. tables, 1925. 8 refs.
DLC, G23.R8, v. 57

Yenisey Bay may be divided into 3 zones according to ice conditions: the areas near the mouths of rivers with sea depths up to 9.6 m., the central zone and the outer area of the Bay. The zone near rivers is ice-covered from mid-Oct. to mid-June; the central area from early Oct. to mid-July; and the outer area from late Oct. to late July. The ice cover in the winter of 1920-21 was 50 cm. thick in Nov. and reached a maximum of 150-160 cm. in May. The development of the ice cover is described in detail. Tides and strong winds cause the formation of long fissures in the ice cover. The depth of the snow cover is greater over ice than over soil because much snow drifts from the continent. Approximately 25 Russian ice terms with suggested English forms are defined.

SIP U6368

Itin, Vivian
SEA WAYS OF THE SOVIET ARCTIC. (Morskie puti sovetskoĭ Arktiki; Text in Russian). Moscow, Izd-vo Sovetskai͡a Azii͡a, 1933, 110p. incl. illus. tables, graphs, maps. 18 refs.
DLC, G630.R8I85, 1933

The navigation conditions of the Polar Seas from Norway to Bering Strait along the 29,000-km. coastline are described. Ice conditions for the period 1900-1932 are analyzed. The graphs indicate that the ice conditions in the Kara Sea are contrary to those in the ocean east of Kolyma. When ice fields close navigation in the Kara Sea, large ice-free areas are prevalent in the eastern regions. Wind direction controlling the ice drift and the influence of the Gulf Stream are important factors in the ice situation. Southwesterly winds in the southern part of the Kara Sea and the southeasterly winds in Chukchi Sea are favorable for navigation.

SIP U6369

[Committee on Electric Heating and Welding]
APPLICATION OF ELECTRIC HEAT FOR VARIOUS PURPOSES; (A) THAWING FROZEN PIPES ELECTRICALLY. Bull. Am. Railway Eng. Assoc. 38, No. 388:29-30 incl. table, Aug. 1936. 3 refs.
DLC, TF1.A47, v. 38

The use of electricity offers a convenient and safe method for thawing frozen pipes. Current may be obtained from transformers or DC generators. General precautions to be taken are enumerated. The time required to thaw a particular size pipe depends largely on the medium surrounding the pipe. The approximate currents and time required to thaw pipes of various sizes of iron or lead are tabulated.

SIP U6370

[Committee on Roadway]
METHODS OF PROTECTING AGAINST DRIFTING SNOW AND OPENING SNOW BLOCKADES. [APPENDIX D]. Bull. Am. Railway Eng. Assoc. 35, No. 360:370-376 incl. diagrs. Oct. 1933.
DLC, TF1.A47, v. 35

Obstructions causing snow to drift on tracks should be removed. Drifting of snow in shallow cuts may be prevented by raising the tracks and eliminating the cut or by reducing the slopes on both sides to 4:1 or flatter. Snow fences are used where the foregoing methods are not practicable or effective. A fixed fence is built as a first line of defense against average storms; portable fences which can be quickly erected are added when and where emergencies occur. Snow sheds are built over cuts 25-30 ft. deep. Equipment used to clear snow from tracks include flangers to remove snow less than 6 in. deep, wedge or push plows placed on the pilot of the locomotive for snow depths up to 2-3 ft., larger push plows for snow up to 6-8 ft. and rotary plows for deeper snow. Methods for removal of snow from yards and terminals depend upon the physical layout, the density of traffic and the amount of snow.

SIP U6371

[Committee on Electric Heating]
APPLICATION OF ELECTRIC HEAT FOR VARIOUS PURPOSES; (A) ELECTRIC SNOW MELTERS. Bull. Am. Railway Eng. Assoc. 35, No. 359:43-47 incl. table, diagrs. Sept. 1933.
DLC, TF1.A47, v. 35

Results of a questionnaire sent to operating companies using electric snow melters are tabulated. Heater units within a given area may be controlled from a central point. They are clean, do not obstruct signals, and may be used in regions of high winds. Heat may be applied quickly and easily as needed. The major disadvantages are high initial cost and the need of abundant low-cost power. The 2 types generally used, direct radiation and combined contact and radiation, are described and illustrated.

SIP U6372

Siegfried
WEATHER PHENOMENA AND MUD CONDITIONS IN THE ARMY AREA. (Witterungserscheinungen und Bodenverschlammung im Armeegebiet; Text in German). Wehrgeologenstelle 14, Az. 39 Geol. 10g Nr. 175/44, G. Nr. 193, 2p. graphs, Sept. 15, 1944. (typed ms.)
DWB, File No. 2735

Climatic conditions and trafficability in the mountain foreland of Tarnow (Poland), 280-m. elevation, are compared with those of Krynica (Poland) located in the mountains at 586-m. elevation. Monthly mean and daily mean temperatures, precipitation, snow depths, frost duration, and trafficability on unconsolidated roads are plotted for each. The ground is continuously frozen from the end of Nov. to about March 10 in the mountains, and from mid-Dec. to about Feb. 20 in the foreland. Snow depths range from 25-50 cm. in the mountains to 10-15 cm. in the foreland.

SIP U6373

Krasser
[SNOWDRIFTS AND FORTIFICATIONS]. (Text in German). Geologenstelle 4, 4p. tables, Jan. 24, 1941. (Letter to the Military Geology Section attached to the Fortification Combat Engineers Commander II at Tomassov/Maz.)
DWB, File No. 2735

Intensive snowdrifts near Jaroslau (Poland) were examined to study their effect on fortifications. Snowdrifts are classified into snow trails and cornices. The snow trails are 2-15 m. long and form on the leeward side of small hills 0.5-2 m. high; snow cornices form on ground elevations with a horizontal longitudinal axis and more than 1.5-2 m. in height, as well as on trenches 1.5-2.0 m. wide and deep. It is recommended that dugouts be sunk as low as possible to prevent the formation of snow trails and shadows easily visible to the enemy. Suggestions for camouflaging trenches which cannot be sunk low are given. Air temperatures, cloudiness, snow depths, wind velocities, and some frost penetration depths are tabulated for Jan. 1-22, 1941.

SIP U6374

Hartmann, Rudolf
ON THE SPONTANEOUS CRYSTALLIZATION OF ICE FROM AQUEOUS SOLUTIONS. (Über die spontane Kristallisation des Eises aus wässerigen Lösungen; Text in German). Z. anorg. u. allgem. Chem. 88:128-132 incl. tables, graph, diagrs. 1914. 1 ref.
DLC, QD1.Z4, v. 88

Ice nuclei of different appearance occur during cooling of aqueous solutions as the result of spontaneous crystallization. Solutions of $C_{12}H_{22}O_{11}$, $MnSO_4$, $MgCl_2$, CH_3COOH, NaOH, $(CH_2OH)_2CHOH$, C_2H_5OH, HCl, and $FeCl_3$ were examined. Four types of nuclei were distinguished: rectangular and hexagonal crystal skeletons adjacent to each other; opaque, white spherolites; white spherelike formations of opaque plates; and ice needles. Each formation is due to a specific supercooling range and water content of the solutions. The m.p. of each type did not vary more than 0.001°C from that of pure water. The linear crystallization speeds of the rectangular crystal skeletons were measured in U-tubes and compared with those of ordinary ice. Results indicate identical speeds.

SIP U6375

Kapterev, P. N.
TRANSFER OF GROUND PARTICLES BY SOIL FREEZING. (Peremeshchenie chastel' grunta pri ego zamerzanii; Text in Russian). Izvestiia Akademii Nauk SSSR, Seriia Geograficheskaia i Geofizicheskaia, 13:268-272 incl. diagr. 1949. 2 refs.
DLC, AS262.A6246, v. 13

Investigations since 1934 showed that the transfer of ground particles always accompanied freezing of

moist soil. This transfer on a large scale is observed in frost heaving, formation of ice in soil, and other phenomena caused by the pressure of freezing water. Laboratory experiments were conducted during 1947-48 with moist samples of argillaceous and sandy soils. The samples were covered with paper and frozen to -3° to -5°C. Moisture migration in moist, argillaceous samples proceeded from the warmer to the cooler parts. The migration in sandy samples was in the opposite direction. Cavities under the paper and a thin frozen layer were found in argillaceous samples. Cavity formation did not occur in moist, sandy soil samples. Argillaceous samples with moisture contents less than 55-60% also formed cavities. The depth of the cavities increased with moisture. Ice crystals first formed in those parts of the sample undergoing cooling, then continued growth in the parts that were thawing through sublimation. These crystals induced an inflow of moisture in the path of their growth.

SIP U6376

SELF-DEICING HYDRANTS FOR LARGE COACH YARD. Railway Eng. and Maintenance, 46:45 incl. illus. Jan. 1950.
DLC, TF1.R58, v. 46

A rubber tube placed under tension inside the riser for its entire length from valve to outlet expands against the riser when the valve is open and the water flowing and contracts to an internal diameter equal to lead pencil size when the valve is shut. This thin column may freeze down to the frost line in cold weather but is flushed out when the valve is reopened. The riser is threaded to the valve mechanism and is easily unscrewed if the rubber needs replacing. The hydrant's performance during protracted periods of extremely cold weather has not been tested.

SIP U6377

Brown, Ernest and George C. Clarke
ICE THRUST IN CONNECTION WITH HYDRO-ELECTRIC PLANT DESIGN WITH SPECIAL REFERENCE TO THE PLANT AT ISLAND FALLS ON THE CHURCHILL RIVER. Eng. J. 15:18-25, 393-397 incl. illus. tables, graphs, diagrs. discussion, Jan., Aug. 1932. 1 ref.
DA, 290.9En3, v. 15

Experiments were undertaken to ascertain the pressure exerted by ice expanding under rising temperatures and to estimate the possible pressure exerted by an ice sheet on the crest of a dam. The temperature of 3-in. ice cubes held in a testing machine was allowed to rise gradually. The thrust exerted against the loading blocks is due to a combined effect of expansion and flow. The ice cubes showed an increase of load from 100-350 lb. for a temperature rise from -30° to 32°F, or an increase of 4000 lb./sq. ft. Various tests were made and the results plotted varying the rate of rise of temperature and introducing cooling effects. The rate of rise in pressure increases with, but more rapidly than the rate of rise of temperature. The combined influence of an increased tendency to flow and the increase in the ice expansion coefficient near 30°F is discussed.

SIP U6378

Menzl, Oswald
ON THE CHLORINE CONTENT OF PRECIPITATION. (Über den Chlorgehalt der Niederschläge; Text in German). Z. Meteorologie, 2:289-295 incl. tables, Oct. 1948. 22 refs.
DLC, QC851.Z4, v. 2

Chlorine-content determinations of rain and melted snow were made on the Donnersberg (Czechoslovakia), surrounded by industrial plants, and at Haid (Czechoslovakia), an agricultural region. The mean Cl content of melted snow on the Donnersberg was 8.12 mg./l. with a maximum of 30.97 mg./l. and a minimum of 1.59 mg./l. The corresponding values for Haid were 5.90, 25.90, and 1.93 mg./l. An analysis is made of these and previous determinations by other investigators. Chlorine concentration increases with elevation up to the lower condensation level and then decreases. The Cl content of precipitation is dependent on the form of precipitation (rain, hail, snow) and on the type, the concentration being greater in squalls. The magnitude of Cl content is shown to vary locally.

SIP U6379

Sprenger, Klaus
ELECTRICAL PRECIPITATION SIGNALING DEVICE. (Elektrisches Niederschlagsmeldegerät; Text in German). Z. Meteorologie, 2:343-344 incl. diagr. Nov. 1948.
DLC, QC851.Z4, v. 2

A device is described which was constructed for the Teterow (Germany) meteorological station to indicate precipitation acoustically in order to aid observers, especially at night. An ordinary Hellmann rain gage was used equipped with a funnel to expedite impinging droplets to the contact. The precipitation closes an electric contact which activates a buzzer inside the station. Electrical heaters are installed on the inside of the receptacle for winter operation.

SIP U6380

Melin, Ragnar
FORECASTING SPRING RUN-OFF OF THE FOREST RIVERS IN NORTH SWEDEN. Geografiska Annaler, 19:118-125 incl. tables, graphs, 1937.
DLC, G25.G4, v. 19

The investigation was limited to 6 forest and coastal rivers in Norrland with considerable snow and a short melting period. The relation between snow cover, total volume and maximum spring run-off was calculated by the correlation method, and run-off during the flood was estimated by discharge rating curves and gage-height observations. An equation was derived which can be used to calculate the mag-

nitude of future floods, total volume of run-off and maximum of run-off of the rivers discussed. Tabulated values for 1915-1933 of total and maximum run-off as observed and computed show good agreement.

SIP U6381

Wolff, A.
WINTER MAINTENANCE OF THE PUBLIC ROADS IN NORBOTTENS CANTON. (Vintervåghållning å allmänna vägar i Norrbottens län; Text in Swedish). Svenska Vägförening. Tid. 23:130-141 incl. illus. tables, April 1936.
DPR, Unclassed periodical

The development of motorized winter traffic and that of required road maintenance are reviewed with critical comments on current snow removal material and methods. Reference is made to the Norwegian snow removal truck with 2 axles with individual differentials equipped with worm gears which together with rut scrapers simplify snow removal.

SIP U6382

Fedorov, L. T.
INVESTIGATIONS AND CALCULATIONS OF THE MAXIMUM RUN-OFF DURING SPRING FLOODS ON RIVERS IN THE EUROPEAN PART OF USSR. (Issledovaniâ i raschet maksimal'nykh raskhodov snegovykh polovodiĭ rek Evropeiskoĭ chasti SSSR; Text in Russian). Problemy regulirovaniâ rechnogo stoka, No. 5:140-238 incl. tables, graphs, maps, diagrs. 1952. 46 refs.
DLC, Slavic unclassified

The amount of water accumulated by snow during the winter, the intensity of spring snow-melting, and the state of the soil during the melt period are principal factors determining the flood run-off. The amount of water in the snow cover is a function of the depth and density of the snow cover, infiltration into the soil, and evaporation from the snow surface. Nearly 10 mm. of water were evaporated from a total water content of 114 mm. at Valdai in 1938. Evaporation from the snow reached 5 mm./day in the Transvolga regions. Water also evaporated from saturated soil surfaces during snow melting. Deep frost penetration and intensive snow-melting increase run-off. Convective heat exchange between the snow and the air is the important factor in melting processes. Formulas and graphs are presented to indicate numerical interrelations applicable for run-off calculations.

SIP U6383

Sokolov, F. V.
AN OUTLINE OF SOUTHEASTERN YAKUTIA. (Ocherk ûgo-vostochnoĭ chasti Âkutskoĭ oblasti; Text in Russian). Izvestiâ Vsesoûznogo Geograficheskogo Obshchestva, 55:181-236 incl. tables, 1925. 2 refs.
DLC, G23.R6, v. 55

The physiographical conditions and natural resources of the area are described. Permafrost occurs throughout the area due to low air temperatures. The permafrost and clear air cause radiation frost even in summer. The thickness of the permafrost depends on a combination of factors, among them being the soil composition, moisture content and the vegetative cover. Open spaces with good drainage and sandy soils have thin permafrost layers. A peat cover has poor thermal conductivity and increases the permafrost thickness. Northern slopes and higher elevations induce thick permafrost. The removal of the vegetative cover produces permafrost degredation. The depth of the upper boundary of the frozen soil varied between 40-70 cm. in Aug. except in the valley of the Aldan River where it was 70-100 cm. Permafrost in swamp areas frequently occurred immediately under the peat cover even in summer.

SIP U6384

Arnol'd-Alâb'ev, V. I.
ATTEMPT AT A PHYSIOGRAPHICAL DESCRIPTION OF THE KURGALOVO PENINSULA SOUTH OF THE FINNISH BAY. (Opyt opisaniâ Kurgalovskogo poluostrova na ûzhnom poberezh'i Finskogo zaliva v fiziko-geograficheskom otnoshenii; Text in Russian with German summary). Izvestiâ Vsesoûznogo Geograficheskogo Obshchestva, 56:5-53 incl. illus. tables, graphs, diagrs. 1924. 36 refs.
DLC, G23.R6, v. 56

The climate of the peninsula fluctuates from maritime to continental with average temperatures of about -7.5°C in winter and 17.0°C in summer. A stable snow cover usually lasts 139 days from mid-Nov. to mid-April and reaches an average maximum depth of about 30 cm. in March. Moderate snowstorms occur on an average of 16 days/winter. Most of the sea around the peninsula is covered with ice, 20-30 in. thick, during Jan.-March. Large fields of floating ice appear frequently near the mouth of the Narova River. Northerly and northeasterly winds drift floating ice fields into the bay and effect its freezing.

SIP U6385

Glasek, Stepan
THE SOIL TEMPERATURE IN ST. PETERSBURG. (Temperatura pochvy v S.-Peterburge; Text in Russian). St. Petersburg, Akademiâ Nauk, 1892, 160p. incl. tables, graphs. 3 refs.
DLC, AS262.S328, v. 69

Soil temperature observations to depths of 3.2 m. were carried out from 1873-1889 using the Lamont System of thermometer installation. Temperatures were measured in 2.7-m. high dunes, and under bare and grass-covered surfaces. Mean and extreme data, as well as monthly and annual variations of soil temperature for various depths are tabulated. The maximum frost penetration was 2.1 m. The soil remained frozen for an average of 120 days at a depth of 0.80 m. and 184 days at the soil surface. Amplitudes of annual variation equal to 79.8°C at the soil

surface diminished to 7.2°C at a depth of 3.2 m. Tables indicate the increase of monthly and annual variations of soil temperatures under bare surfaces.

SIP U6386

Müller, P. A.
EVAPORATION OF THE SNOW COVER. (K voprosu ob isparenii snezhnogo pokrova; Text in Russian). St. Petersburg, Akademiîa Nauk, 1892, 53p. incl. tables. 7 refs.
DLC, AS262.S328, v. 69

Snow surface temperatures were measured hourly during the winter of 1890-91 at the Ekaterinburg Observatory (Sverdlovsk) to study snow-cover evaporation. Dew-point data were used to determine conditions favorable for evaporation or condensation. Tabulated values show that conditions were favorable for evaporation in 73% of all cases throughout the winter. The Feb. data were compared with observational data on the appearance of hoarfrost near the snow surface, and good agreement was obtained. The dew-point method indicated conditions favorable for condensation in 47 cases during Feb.; hoarfrost was noted in 49 cases.

SIP U6387

Abel's, G.
MEASUREMENTS OF SNOW DENSITY IN EKATERINBURG DURING WINTER 1890-91. (Izmerenie plotnosti snega v Ekaterinburge zimoû 1890-91 gg.; Text in Russian). St. Petersburg, Akademiîa Nauk, 1892, 24p. incl. tables. 2 refs.
DLC, AS262.S328, v. 69

The average density of the snow cover varied from 0.14 (fresh snow) to 0.28 (snow-melting period). The lowest densities of fresh snow ranged between 0.10-0.12. The snow cover density was close to ice density (0.9) near the end of the snow-melting period. Snow density variations depend on temperature, humidity and location. Fluffy snow was formed during calm, moderately dry weather, when each falling snowflake retained its crystalline structure. Low temperatures prevented density increases through gravity by increasing elasticity in the snow crystals. Warm humid weather induced higher densities through the adhesion of falling snowflakes. The effects of wind compaction and solar radiation on snow cover density are described.

SIP U6388

Kapterev, P. N.
ASYMMETRIC VOLUME INCREASE OF FREEZING WATER. (Neravnomernoe raspredelenie prirosta ob"ema vody pri zamerzanii; Text in Russian). Doklady Akademii Nauk SSSR, 58:225-228 incl. diagr. 1947.
DLC, AS262.S3663, v. 58

The phenomenon was studied during 1934-36 and 1946 at the Skovorodino Experimental Station (Chita province) and in Moscow. Water was frozen in glass and metallic containers at temperatures from 0° to -38°C. Moderately low temperatures produced naleds; temperatures of -25°C and lower produced frost-heave formations. Water frozen in a rubber tube increased the diameter of the tube at the middle by 16% without changes in the length of the tube. Water frozen in a square rubber bag increased the thickness of the bag by 25% and decreased its length and width by 4 - 11%.

SIP U6389

Keränen, J.
THE TEMPERATURE OF THE GROUND AND THE SNOW COVER IN SODANKYLÄ AS OBSERVED WITH THERMOELEMENTS. (Über die Temperatur des Bodens und der Schneedecke in Sodankylä nech Beobachtungen mit Thermoelementen; Text in German). Ann. Acad. Sci. Fennicae, Ser. A13, No. 7: 1-197 incl. illus. tables, graphs, diagrs. 1920. [30] refs.
DLC, Q60.H52, Ser. A13

The methods used to measure the temperature of snow and soil at various depths by means of Cu-constantan thermocouples are described. The accuracy of the method is analyzed and mean temperature values are derived for the air, the snow and ground surfaces, and at various depths within the snow cover and soil. The general properties of the snow cover, the daily temperature variations within the snow cover, the thermal conductivity of snow, and the penetration of solar radiation into the snow cover are discussed. Included are analyses of frost penetration into the ground and the thawing process of the ground.

SIP U6390

Keränen, J.
THE DENSITY OF NEW SNOW IN SODANKYLÄ IN WINTER 1917-18 ACCORDING TO OBSERVATIONS BY H. LINDFORS. (Die Dichte des frischgefallenen Schnees in Sodankylä im Winter 1917-18 nach den Beobachtungen von H. Lindfors; Text in German). Ann. Acad. Sci. Fennicae, Ser. A13, No. 8:3-15 incl. tables, 1920. 8 refs.
DLC, Q60.H52, Ser. A13

The results of snow density measurements made by means of a snow board and a vertical gage inserted into the board are discussed and compared with determinations made elsewhere. The volume of the snow was determined by inserting a rain gage into the snow on top of the snow board. The observation date, time of snowfall and observation, mean air temperature, snow depth, volume, density, and snow type are tabulated. The density of new snow at various temperatures and for various snow types is tabulated and discussed.

SIP U6391

Remick, John T.
THE EFFECT OF LAKE ERIE ON THE LOCAL DISTRIBUTION OF PRECIPITATION IN WINTER. Bull. Am. Meteorological Soc. 23:1-4, 111-117 incl. maps, Jan., March 1942. 10 refs.
DLC, QC851.A6, v. 23

Snow flurries occurring on the east side of Lake Erie are described. The average ratio of snow to water is about 18:1. The Jan. average ratio at Watertown (N. Y.) is 27:1. Snow flurries are due to frictional and thermal influences. A strong flow of cold polar air, a large temperature contrast between air and water increase the frictional and thermal effects respectively. A long trajectory over the lake increases both frictional and thermal effects. Snow-flurry effect is maximum from Oct.-Dec., minimum from March-May. Precipitation and snowfall depths from individual storms are discussed and mapped.

SIP U6392

Brown, Ernest, B. R. McGrath and Robert E. Kennedy
THRUST EXERTED BY EXPANDING ICE SHEET; DISCUSSION. Proc. Am. Soc. Civil Engr. 72:1391-1400 incl. tables, graphs, diagr. Dec. 1946.
DLC, TA1.A52, v. 72

Suggestions in connection with Rose's paper on the thrust exerted by an expanding ice sheet are presented. One method proposed to compute ice pressures incorporates Brown and Clarke's ice pressures due to temperature increase, an adaptation of Schmidt's temperature gradients within a mass for 1-dimensional heat flow, and the effects of lateral restraint according to the theory of elasticity. Field measurements of ice pressures with their accompanying temperature records at various reservoirs, and laboratory tests for the determination of Poisson's ratio variations with ice-temperature changes would contribute toward a better understanding of ice pressures. A table compiled by the Bureau of Reclamation on ice thicknesses on reservoirs and lakes is included. (See also SIP U306)

SIP U6393

Chekotillo, A. and others
INSTRUCTIONS FOR THE DETERMINATION OF THE DEPTH OF LAYING THE FOUNDATIONS OF SMALL BUILDINGS IN RELATION TO THE DEPTH OF SOIL FREEZING. (Proekt ukazaniĭ po opredeleniĭu glubiny zalozheniĭa fundamentov maloetazhnykh zdaniĭ v zavisimosti ot glubiny promerzaniĭa gruntov; Text in Russian). p.63-67. (In: Glubina zalozheniĭa fundamentov maloetazhnykh zdaniĭ v svyazi s sezonnym promerzaniem gruntov, by N. A. Tsytovich and others, Moscow-Leningrad, Izd-vo Akademii Nauk SSSR, 1946)
DLC, TH5201.T8, 1946

Actual and estimated depths of frost penetration are differentiated. The estimated depth is used in practice with the following considerations. It is assumed that water freezes at 0°, -0.5° and -1.0°C in gravel, silt and clay respectively. The temperature distribution in the ground is taken as an average of long-range observations. The values obtained for sandy soil are multiplied by a coefficient 0.8 for fine-sandy soil and 0.7 for clayey soil. Control measures against heaving are drying, screening from water, or keeping the foundations warm. The depth of foundations can be 0.7 m. less than the estimated depth of frost penetration whenever these countermeasures are used.

SIP U6394

Gol'dshteĭn, M. N.
MECHANICAL PROPERTIES OF SOILS. (Mekhanicheskie svoĭstva gruntov; Text in Russian). Moscow, Gosizd-vo Literatury po Stroitel'stvu i Arkhitekture, 1952, 259p. incl. illus. tables, graphs, diagrs. 41 refs.
DLC, TA710.G577, 1952

Phenomena accompanying freezing of water in ground, water permeability, dehydration, and the influence of ground structure on the freezing processes are described. Temperatures of ice formation in various soils are tabulated. Factors influencing ground freezing include the size of ground particles, the speed of temperature change and the initial water content of the ground. The influence of load on frozen ground during this stage of consolidation is formulated. Compression curves of ground during the freezing and thawing process are compared graphically.

SIP U6395

Rose, Edwin
THRUST EXERTED BY EXPANDING ICE SHEET; DISCUSSION. Proc. Am. Soc. Civil Engr. 73:975-980 incl. tables, graphs, June 1947. 4 refs.
DLC, TA1.A52, v. 73

A discussion of a previous paper is continued. Temperatures computed in an ice sheet 2 ft. thick divided into 8 slabs of 0.25-ft. thickness using the formula of one-dimensional heat-flow are tabulated. Graphs are used to indicate estimated temperature gradients and the corresponding pressure curves and total thrusts for a 2-ft. ice sheet with air temperature rises of 5°, 10° and 15°F/hr. and for 1-ft. and 4-ft. ice sheets for a temperature rise of 10°F/hr. and the results tabulated. The variation of maximum ice thickness with accumulated degree-days is discussed. (See also SIP U306, U6392)

SIP U6396

Portman, Donald J.
AIR AND SOIL TEMPERATURE DISTRIBUTIONS NEAR A MELTING SNOW COVER. [19]p. incl. tables, graphs, [1952]
SIPRE files, S-1350

Hourly observations of air and dew-point tempera-

tures, wind speeds, soil temperatures and net radiation exchange were recorded from March 2-4, 1952 at Shirley field station, while the snow-air interface was near 0°C much of the time. A preliminary instrumental checking was not made and a constant error of 2.64°C was apparent in the temperature measuring equipment, necessitating a correction of -2.64°C. The variation of temperature with time at different depths in the soil and different heights in the air are plotted. The normal diurnal thermal variation of soil temperature beneath a bare soil is absent. The ratios of temperature differences for different heights above the ground are tabulated and compared with the tabulated ratios of wind speed differences at the same heights for hours of the day when the snow is melting. The mean average of the ratios of wind speed differences is more than twice the average of the temperature difference ratios. This condition indicates a lack of similarity between the wind and temperature structures near the snow surface.

SIP U6397

[DAILY SNOW COVER DEPTHS GABEL 762 m.; (Tägliche Schneedeckenhöhen Gabel 762 m.; Text in German)]. graph, [1944].
DWB, File No. 2735

Daily snow cover depths from Sept.-May 1922-1944 are plotted for Gabel (Poland) at an elevation of 762 m.

SIP U6398

[ICE CONDITIONS ON THE VISTULA RIVER]. (Text in German). Wehrgeologenstelle 16/Obkdo. H. Gr. A/Gen. d. Pi. Nrs. 653/44, 654/44, 669/44, 676/44, 692/44, 5p. 1944. (Graphs)
DWB, File No. 2735

Ice thicknesses at various river gages, icing frequencies for various years and dates of icing of the central and upper Vistula are plotted. Evaluation of the data is included.

SIP U6399

ICE CONDITIONS ON THE VISTULA 1895-1937. (Eisverhältnisse auf der Weichsel 1895-1937; Text in German). Wehrgeologenstelle 16, Obkdo. H. Gr. A/Gen. d. Pi., Az. 39 Geol. 18e Br. B. Nr. 1198/44, Report No. 572/44, 11 graphs, Sept. 29, 1944.
DWB, File No. 2735

Ice conditions from 1895-1937 for 11 river gages between Ratowa and Szczucin (Poland) are graphed.

SIP U6400

ICING OF THE LEFT TRIBUTARIES OF THE VISTULA. (Vereisung linker Nebenflüsse der Weichsel; Text in German). Wehrgeologenstelle 16/Obkdo. H. Gr. A/Gen. d. Pi. Nr. 689/44, 1p. incl. graphs, map, 1944.
DWB, File No. 2735

Graphs indicating the icing conditions for 1928-1931 for 9 river gages (Poland), and graphs showing the frequency of ice formation from 1924-1937 are presented.

SIP U6401

ICE THICKNESSES ON TRIBUTARIES OF THE VISTULA. (Eisstärken auf Nebenflüssen der Weichsel; Text in German). Wehrgeologenstelle 16/Obkdo. H. Gr. A/Gen. d. Pi. Nr. 694/44, 1p. incl. table, graphs, maps, Jan. 6, 1945.
DWB, File No. 2735

Graphs indicating the variation in ice thickness from Jan.-March for different years at 15 river gages are presented. A tabulation of bearing capacities of ice indicates that a 4-cm. ice cover will support individual soldiers spaced at minimum intervals of 5 m. A 65-cm. ice cover will support 65 tons spaced at a minimum of 65 m.

SIP U6402

Frentzen
BEGINNING OF THE ICE DEBACLE. (Eisgang-Beginn; Text in German). Bv. T. O. Heeresgruppe Süd, 1p. table, Jan. 15, 1942. (typed ms.)
DWB, File No. 2735

Observed mean and limiting values of the beginning of the ice debacle at various Dnepr River (USSR) gages are tabulated. The debacle begins in the lower course of the Dnepr, reaches Dnepropetrovsk on the average in mid-March, one week later Kiev, and Rechitsa at the end of March.

SIP U6403

Germany. Generalinspektor für Wasser und Energie
SURVEY OF THE MEAN DURATION OF SHIPPING INTERRUPTION BY ICE DURING THE 10 WINTER HALF-YEARS 1933-34 TO 1942-43. (Übersicht der mittleren Dauer der Schiffahrtunterbrechungen durch Eis aus den 10 Winterhalbjahren 1933/34 bis 1942/43; Text in German). WI 15G 6746/44, 7p. incl. tables, 1944. (typed ms.)
DWB, File No. 2735

The mean number of days of shipping interruption by ice on various German rivers and canals are tabulated.

SIP U6404

Neppel
REPORT ON THE FLOOD AND ICE CONDITIONS OF THE RIVERS IN THE ARMY AREA. (Bericht über die Hochwasser und Eisverhältnisse der Flüsse im Armeegebiet; Text in German). Wehrgeologenstelle 23, Az: 39 Geol. 10g Nr. 249/44, 2p. supplements 1-10, Oct. 15, 1944. (typed ms.)
DWB, File No. 2735

Flood, ice, and ice breakup conditions of the Vistula,

Bug, and Narev rivers in Poland and some of their tributaries are given for various river gages. Ice conditions are based on the observation period 1929-1934. Mean and extreme dates of first and last frosts, mean number of days with snow cover, and the number of frost and ice days with temperatures constantly below 0°C and below -10°C are tabulated for various stations.

SIP U6405

Mason, Derek
AIRCRAFT AND ICING RESEARCH-I. Weather, 8:243-246, Aug. 1953.
DLC, QC851.W4, v. 8

Flight trials to test the fluid de-icing system were conducted in Iceland to determine the minimum rate of flow which will provide efficient de-icing in measured conditions, and to compare the properties of the standard R.328 fluid with those of 4 newly developed fluids. Little difference was apparent in the efficiency of the various fluids under test. The time for removal of ice was much higher than expected. A flow rate of 1 pt./sq. ft./hr. produced efficient anti-icing results for all measured severities. The tests were inconclusive because no severe conditions were encountered.

SIP U6406

Skaven Haug, S. V.
NORSE MAKE SCIENTIFIC ATTACK ON HEAVING TRACK. Ry. Eng. and Maintenance, 44:404-406, 409 incl. illus. table, graphs, diagrs. April 1948.
DLC, TF1.R58, v. 44

Serious frost heaving on track sections of the Norwegian State Railways was prevented by excavating the frost forming soils and substituting materials with minimum expansion upon freezing. Partially successful methods such as drainage and lifting of rails are discussed. The excavation must be deep enough to prevent frost penetration in the severest winter and the width should be 1.50 m. wider than the ties. Replacement materials with the highest water content are most satisfactory, due to their ability at storing up cold when their water content freezes. Ballast materials should be dry to reduce heat conduction. A succession of layers, the bottom one as wet as possible and the top one as dry as possible offer the greatest combined resistance to frost heaving. Excellent results are obtained with firmly pressed peat blocks 0.3-0.5 m. thick for the bottom layer and 0.50 m. of broken stone for the ballast.

SIP U6407

Schell, I. I.
THE PROBLEM OF THE ICEBERG POPULATION IN BAFFIN BAY AND DAVIS STRAIT AND ADVANCE ESTIMATE OF THE BERG COUNT OFF NEWFOUNDLAND. J. Glaciology, 2:58-59 incl. table, March 1952. 4 refs.
DLC, Unbound periodical

An estimate of the iceberg population at the end of March off Newfoundland is obtained by a formula based on the Dec.-March pressure gradient between Labrador and southernmost Greenland. Favorable agreement between computed and actual deviations was obtained by using the formula. These deviations are expressed as a correlation coefficient of value 0.81. No provision is made in the formula for information about the Labrador Current. Results of a regular program of observation of the volume and temperature of the Current are tabulated for 1928-1948. The average value of the Current is 4.0×10^6 cu. m./sec. and the average berg-count value is 4.8 on the scale of 10. The marking of bergs is recommended to obtain information of their behavior after leaving west Greenland fjords.

SIP U6408

Kudrîavaîa, K. I.
MARITIME HYDROLOGICAL FORECASTS. (Morskie gidrologicheskie prognozy; Text in Russian). Leningrad, Gidrometeoizdat, 1951. 276p. incl. tables, graphs, maps, diagrs. 178 refs.
DLC, QC994.K85, 1951

Methods of maritime forecasting in the USSR are described. The climatological procedures and the methods of analogy, classification of processes and empirical relations, and their application to forecasting ice regime, water temperature and level variation are discussed. The ice conditions in the seas surrounding the USSR can be divided into 4 groups. The arctic regions are characterized by ice fields throughout the year. The seas of the Far East (except the Japan Sea) are subjected to ice fields up to 10 months. The Baltic and White Seas, and the northern part of the Japan Sea are ice covered up to 7-8 months. Ice processes are observed in the southern seas for no longer than 3-6 months.

SIP U6409

Thompson, Thomas L.
DETECTION AND MEASUREMENT OF THIN SURFACE FILMS ON SOLIDS. Wright Air Development Center, Tech. Memo. Rept. WCNS 52-28, 13p. incl. diagr. appendices 1-3, May 25, 1953. [72] refs. (Contract No. AF 33[600]-6256)
SIPRE files, S-1399

Information concerning construction of an optical apparatus for studying the surface properties of solids is given. The apparatus will be used to detect and measure the thickness of adsorbed films of water molecules on ice and on ski-bottom materials, and to study their influence on the sliding characteristics of skis on snow and ice.

SIP U6410

Burgard, Edward C.
FLIGHT ICING TESTS OF F-94 AIR INDUCTION SYSTEM. Wright Air Development Center, Tech. Note WCT-52-75, 3p. illus. tables, appendices 1-4, Oct. 29, 1952. (SEO No. 269-5)
ASTIA, AD 13203

Flights were made during the 1951-52 icing season whenever potential icing conditions were thought to exist. The instrumentation installed for the tests is described. Ice forming on the air intake scoop lip and boundary layer air bleed ports builds up to a limited extent, breaks off, and is then swept through the intake duct. Ice does not form directly on the plenum chamber screen but collects there as a result of blow-off from air intake components in the path of direct impingement up-stream from the screen. Considerable increase in power setting was needed to maintain a given air speed during a 30-min. flight under icing conditions. No appreciable increase in tail pipe temperatures was noted.

SIP U6411

Tverskoĭ, P. N.
ATMOSPHERIC ELECTRICITY. (Atmosfernoe elektrichestvo; Text in Russian). Leningrad, Gidrometeoroizdat, 1949, 252p. incl. illus. tables, graphs, maps, diagrs. 31 refs.
DLC, QC961.T9, 1949

Methods of investigating atmospheric electrical phenomena including the electrical conductivity of the air and ionization processes are described. The electrical states of 4 groups of precipitation are examined: rains, showers, thunderstorms, and solid precipitation in the form of snow and hail. Snowflakes have positive and negative charges. Snowflakes, particularly when dry usually have a higher electrical charge than raindrops. Calm weather increases the number of snowflakes with negative charge. The observations of I. S. Anikeev made during 1947-48 at Lesnoĭ (Leningrad) confirm that snowflakes are negatively charged more often than raindrops but that the total amount of snow precipitation remains positive.

SIP U6412

Sumgin, M. I. and B. N. Demchinskiĭ
CONQUEST OF THE NORTH. IN THE AREA OF PERMAFROST. (Zavoevanie Severa [V oblasti vechnoĭ merzloty]; Text in Russian). Moscow-Leningrad, Izd-vo Akademii Nauk SSSR, 1938, 156p. incl. illus. tables, graphs, maps, diagrs. 4 refs.
DLC, S599.R9S85, 1938

The origin and characteristics of permafrost are described. Permafrost was discovered in Yakutia in 1640-1643; its scientific investigation was begun in the middle of the 19th century by A. F. Middendorf. Permafrost in the USSR covers an area equal to Europe in size. The 2 principal forms of permafrost are the residual remnant of the glaciation period and frozen soil effected by severe climatic conditions in northern Europe and Asia. The depth, and by-products of permafrost, such as naleds, frost heavings and ice mounds, are discussed. The importance of soil composition and vegetation on permafrost is noted. Improvements of construction and agricultural projects in permafrost areas are discussed.

SIP U6413

Koloskov, P. I.
THE THERMAL MELIORATION IN THE REGIONS OF PERMAFROST AND DEEP FROST PENETRATION OF SOIL. (K voprosu o teplovoĭ meliorafsii v oblastfakh vechnoĭ merzloty i glubokogo zimnego promerzaniĭa pochvy; Text in Russian). Materialy Komissii po Izucheniĭu Estestvennykh Proizvoditel'nykh Sil Soĭuza, No. 80:201-231 incl. tables, 1930. 2 refs.
DLC, HC331.A6, 1930

The heat balance of soil in permafrost can be improved by increasing thermal conductivity during the day and summer, by mineralizing organic matter, and by lowering the heat loss at night and in winter. Forests increase the average annual temperature of the soil through preservation of the snow cover. A scant snow cover and a denuded soil surface without stubble lowers the heat supply in soils. Data are given indicating the extent and direction of average annual temperature and temperature variations in relation to changes of surface cover conditions.

SIP U6414

Müntz, A. and E. Lainé
AMMONIA IN RAINS AND SNOWS AT OBSERVATION STATIONS OF THE CHARCOT MISSION. (L'ammoniaque dans les pluies et les neiges des stations d'observation de la Mission Charcot; Text in French). Compt. Rend. 153:749-750 incl. table, Oct. 23, 1911.
DLC, Q46.A14, v. 153

Four rain and 14 snow samples were collected near the South Pole and analyzed for NH_3 content. The date and location of the sample's origin and its NH_3 content are tabulated. NH_3 in snow samples varied from 0.15-1.52 mg./l. of water. The NH_3 distribution in snows and rains near the South Pole is close to that observed for various European stations.

SIP U6415

ST. PAUL UNION PASSENGER TERMINAL IS ALL SET FOR WINTER. Ry. Eng. and Maintenance, 41: 868-873 incl. illus. diagrs. Sept. 1945.
DLC, TF1.R58, v. 41

A car-mounted snow melter used to keep single and slip switches clean and operative under severe icing conditions is described. The new snowplow loader, the Sno-Flyr-rotary plow, has a nose-type plow with gathering side wings, 2 multiple vane rotors, ice flanger, raker bar and a discharge shute. The ice-cutting arrangement in the form of a wedge shaped scarifier flanger rips out ice adjacent to and between the track rails. Snow and ice are mechanically loaded on cars for disposal in the Mississippi River. The combined operation of the snow melter and snowplow loader is described in detail.

SIP U6416

Kalitine, N. N.
VALUES OF DIFFUSE RADIATION OF THE ATMOSPHERE. (Sur les valeurs de la radiation diffuse de l'atmosphere; Text in French). Gerlands Beitr. Geophys. 50:279-284 incl. tables, graphs, 1937. 4 refs.
DLC, QC801.B3, v. 50

The maxima of diurnal diffuse radiation at Matochkin Shar, Uedinenie Island and Cape Shmidt were found to be 566, 642 and 604 cal. whereas at Slutsk (near Leningrad) it was only 276 cal. The high values of diffuse radiation are explained by high albedo of the snow-covered arctic and low cloud density.

SIP U6417

Končk, M.
RIME ON THE LOMNICKÝ PEAK AND A NEW DEVICE FOR RECORDING RIME. (Zúzmaramérések a Lomnici csúcson és egy új műszer a zúzmaralerakódások önműködő regisztrálására; Text in Hungarian with French and Russian summaries). Időjárás, 56:333-337 incl. table, graph, diagr. Nov.-Dec. 1952.
DLC, QC851.M125, v. 56

A summary of rime deposit observations made on the Lomnický Peak (Czechoslovakia) during 1941-1944 and 1947-1949 is presented. The deposits were measured by weighing a horizontal and a vertical wooden rod of specific surface area. The mean monthly amounts measured and the mean number of days per month with rime are tabulated. The average amount formed between 9 p.m. and 7 a.m. was 5.1 kg./sq. m., between 7 a.m. and 2 p.m. was 1.0 kg./sq. m. and 3.6 kg./sq. m. between 2-9 p.m. An electrically heated rime recorder used since Aug. 1952 is described.

SIP U6418

Kalitin, N. N.
ROLE OF ACTINOMETRY IN THE SOLUTION OF PERMAFROST PROBLEM. (Rol' aktinometrii v razreshenii problemy vechnoĭ merzloty; Text in Russian). Materialy Komissii po Izucheniiû Estestvennykh Proizvoditel'nykh Sil Soiûza, No. 80:157-176 incl. illus. tables, graphs, diagr. 1930. 12 refs.
DLC, HC331.A6, 1930

Small amounts of atmospheric moisture in permafrost regions permit increased incoming solar radiation and simultaneous radiational loss to the atmosphere. Radiational loss accounts for the increased cooling of the earth's surface in winter. Similarly, ozone and CO_2 absorb radiation energy. The solar radiation balance according to latitude is tabulated. Methods are described for measuring incoming and outgoing, direct and indirect radiation of the snow cover, denuded soils, vegetation, water, and glaciers with various types of instruments.

SIP U6419

Stepanov, N. N.
PLANTING AND MAINTENANCE OF SNOW HEDGES, FOREST BELTS, AND TREE-NURSERIES FOR RAILROADS. (Rukovodstvo k ustroĭstvu i soderzhaniiû snegozashchitnykh nasazhdeniĭ i drevesnykh pitomnikov na zheleznykh dorogakh; Text in Russian). Moscow, Transpechat', 1928, 216p. incl. illus. tables, diagrs. 2 refs.
DLC, TF542.S7, 1928

A history of snowdrift prevention through the use of snow hedges and forest belts along railroads is presented. Species of bushes and trees according to climate and soil conditions are described and methods of improved maintenance are discussed. Wind flow variations around obstacles are analyzed and results of investigation of snow deposit forms are reviewed. Construction of snow hedges and forest shelter belts, location and width for various forms of relief in steppe regions are described in detail.

SIP U6420

Sumgin, M. I.
PRESENT STATUS OF INVESTIGATIONS OF PERMAFROST IN THE USSR AND DESIRABLE FUTURE INVESTIGATIONS. (Sovremennoe polozhenie issledovaniiâ vechnoĭ merzloty v SSSR i zhelatel'naîa postanovka etikh issledovaniĭ v blizhaĭshem budushchem; Text in Russian). Materialy Komissii po Izucheniiû Estestvennykh Proizvoditel'nykh Sil Soiûza, No. 80:1-41 incl. illus. tables, map, diagrs. 1930. 6 refs.
DLC, HC331.A6, 1930

Artificial icings were obtained by filling shallow cylinders with sandy soil of 21-22% water content and freezing at -16° to -19°C. An icing begins to form with the appearance of a crack over the ice lens in the slightly convex top of the sample. Similar cracks formed in peat samples when ice lenses formed between 2 layers of peat. These experiments suggest that large peat mounds in tundra, 3-8 m. high and 5-25 m. wide are formed in a similar manner. Spotty tundra is formed by the action of hydrostatic forces in talik layers between the frozen surface and permafrost layers. A relationship is shown between formations such as surface icings and peat mounds in permafrost regions and landscape relief and stresses in the soil. The soil temperature in the Zabaykal Petrovsk valley averaged -0.6°C at a depth of 6 m. and -0.4°C at 15 m. in permafrost 21.2 and 49 m. thick respectively.

SIP U6421

Hachey, H. B.
THE ROTATION OF MELTING ICE SUSPENDED IN BENZINE. J. Franklin Inst. 204:825-827, June 1924. 2 refs.
DLC, T1.F8, v. 204

Ice rotates when suspended in benzol. The speed of rotation decreases as the temperature of the benzol

is lowered and all rotation ceases when the benzol is at 0°C. Rotation also occurs in gasoline but not in water. The rotation is probably due to the downward flow of the denser melted water producing a torque due to its irregular motion reacting on the ice, particularly when the surrounding medium is much less dense.

SIP U6422

Dennis, A. S.
INITIATION OF SHOWERS IN CUMULI BY SNOW. Sci. Rept. MW-14 McGill U. MacDonald Physics Lab. [34]p. illus. diagrs. appendix, June 1953. 25 refs. (Contract No. AF-19[122]-217)
DWB, Unclassed

Radar photographs in vertical section show that snow trails frequently occur around the tops of showers. These records were studied for evidence of showers initiated by these snow trails. The snow could be effective by seeding the supercooled portion of cumulus clouds or by increasing the moisture content of entrained air and induce precipitation when the cloud top is between -5° and -12°C or increase the proportion of precipitating clouds at colder temperatures. The organization of sets of vertical sections into plan diagrams gives evidence of the more frequent occurrence of showers in regions affected by snow trails than elsewhere.

SIP U6423

Bigg, E. K.
THE SUPERCOOLING OF WATER. Proc. Phys. Soc. (London), 66:688-694 incl. table, graphs, Aug. 1, 1953. 13 refs.
DLC, QC1.P5, v. 66

Two experimental techniques were used to determine the freezing temperatures of supercooled drops. In one method the drops are suspended at the interface of 2 immiscible liquids, one heavier, the other lighter than water. In the other method the drops are placed on a hydrophobic film of silicone oil and covered with paraffin. Water from 3 different sources was used in the experiments. In each case the mean f.p. of 1-mm. diam. drops cooled at 0.5°C/min. was within 0.5°C of -23.8°C. The influence of drop volume and rate of cooling was studied. The mean freezing temperature is directly proportional to the log. of the drop diam. and the cooling rate has a small but real effect on freezing. Further supercooling is possible with higher cooling rates.

SIP U6424

Quincke, G.
THE FORMATION OF ICE AND THE GRAINED STRUCTURE OF GLACIERS. Proc. Roy. Soc. (London), 76:431-439, Dec. 1905.
DLC, Q41.L7, v. 76

It is assumed that ice is a liquid jelly, with foam walls of concentrated oily salt solution, which enclose foam-cells containing viscous, doubly refracting, pure or nearly pure water. Glacier grains are considered foam-cells filled with pure or nearly pure ice, and separated from one another by visible or invisible walls of oily salt solution. The effects of temperature and pressure changes, radiation, salinity, air content, freezing and thawing on ice are interpreted in the light of the foregoing hypothesis.

SIP U6425

Richards, Theodore W. and Clarence L. Speyers
THE COMPRESSIBILITY OF ICE. J. Am. Chem. Soc. 36:491-494 incl. diagr. March 1914. 8 refs.
DLC, QD1.A5, v. 36

The method used in the experimental determination of the compressibility of ice is described. A discussion of the data and results and a comparison with Bridgman's calculated value are presented. The compressibility of ice between 100 and 500 megabars is found to be 0.0000120 at -7.03°C or about 0.25 of the compressibility of water at neighboring temperatures. The decrease in the compressibility of ice with increasing pressure is small.

SIP U6426

Shostakovich, V. B.
CLIMATE OF IRKUTSK. (Klimat Irkutska; Text in Russian). Irkutsk, 1920, 102p. incl. tables, appendix. 5 refs.
DLC, Slavic unclassified

Actinometric and meteorological data from 1887-1916 at the Irkutsk Magnetic-Meteorological Observatory are tabulated and discussed. Tables and graphs show hourly, monthly, and annual variations of the meteorological elements, and their dependence on physiographical factors. Soil temperatures were observed to depths of 5.0 m. under denuded soil, and ground with a vegetative cover. The soil under natural conditions was warmer than that under denuded surfaces. The mean frost penetration was 225 cm. under denuded soil and 177 cm. under grass-covered surfaces. The snow cover in Irkutsk usually remained stable from mid-Oct. to April. The mean depth of the snow cover was 22 cm. and the maximum was reached in Feb.-March. Snow-density measurements of 1908-1916 showed that the mean density equaled 0.071 in Oct. and reached a maximum of 0.298 in April before snow melting.

SIP U6427

Shmidt, P. Ŭ.
PHYSIOGRAPHICAL CONDITIONS AND FAUNA OF THE JAPAN AND OKHOTSK SEA. (O fiziko-geograficheskikh usloviĭakh i faune Ĭaponskogo i Okhotskogo morei; Text in Russian). Izvestiĭa Vsesoiuznogo Geograficheskogo Obshchestva, 39:1-30 incl. tables, 1903. 8 refs.
DLC, G23.R6, v. 39

The sea adjacent to the Arctic Ocean is ice-covered from Nov.-July. Even in Aug., the warmest month,

the surface temperature does not rise above 10°C. The Okhotsk Sea is covered with floating ice during the major part of the summer. The western part of the Japan Sea is covered with thick ice from Dec.-Jan. to March-April. The eastern part is open to navigation throughout the winter because a warm current prevents ice formation.

SIP U6428

Pod'yakonov, S. A.
NALEDS OF EASTERN SIBERIA AND THEIR ORIGIN. (Naledi Vostochnoy Sibiri i prichiny ikh vozniknoveniya; Text in Russian). Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, 39:305-337 incl. illus. diagrs. 1903.
DLC, G23.R6, v. 39

Naleds were studied in Yakutia for 3 yr. The rate of naled formation increases with increased frost penetration, water flow, and thermal conductivity of the soil. Naleds form over ice-covered river surfaces and over frozen soil surfaces. Naled formation is favored when permafrost forms an impermeable layer over veins of ground water. River naleds form when the river freezes solid, when the flow under an ice cover is increased, and over a multi-layered ice cover. A sudden increase in water level, whether underground or under ice-covered rivers, is the main cause of naleds and icing mounds.

SIP U6429

Herpich, Hans
THE ICE CONDITIONS ON SOUTH BAVARIAN LAKES. (Die Eisverhältnisse in den südbayerischen Seen; Text in German). München, Theodor Ackermann, 1911. 89p. incl. tables, graphs, maps, diagrs. [25] refs.
DLC, GB1295.H4

Dates of first, complete and last freezing of 139 lakes from 1904-1909 were studied. Large lakes and lakes at high elevations are treated separately. Thermal variations in a lake basin are analyzed on the basis of water temperatures. The effects of air temperature, cloudiness, precipitation, wind, configuration of the lake basin, and lake surroundings on the icing process are discussed. The developmental and thaw processes of the ice cover, and the structural changes of the ice are treated.

SIP U6430

Khmyznikov, P. K.
NAVIGATION IN THE LAPTEV SEA AND IN THE WESTERN PART OF THE EAST-SIBERIAN SEA DURING 1878-1935. (Opisanie plavaniya sudov v more Laptevykh i v zapadnoy chasti Vostochnosibirskogo morya s 1878 po 1935 gg.; Text in Russian). Leningrad, Izd-vo Glavsevmorputi, 1937, 180p. incl. illus. maps. 57 refs.
DLC, G820.K5, 1937

Published reports, unpublished manuscripts, and navigation logs are the basic sources of this study. Weather and ice conditions for each of approximately 70 voyages are described. Current ice and weather terminology has been substituted in the original reports. The first systematic records of ice conditions were kept by the Bering Expedition in 1735.

SIP U6431

Chirvinskiy, P. N.
SNOW-AVALANCHE DANGER ZONES IN THE KHIBINY TUNDRAS. (Opyt opredeleniya lavinoopasnykh zon po nablyudeniyam v khibinskikh tundrakh; Text in Russian). Zemlevedenie, Novaya Seriya, 2:221-236 incl. illus. map, graphs, diagrs. 1948. 5 refs.
DLC, G1.Z1, v. 2

The avalanche studies of 1937-1939 are analyzed and discussed. Snow accumulates on slopes with grades of 25°-42° but the deposit is in an unstable state of equilibrium. The stability of a snow deposit increases if the slopes are terraced and wooded. Peat cover and low bushes increase avalanche danger because of poor cohesion between the upper and lower snow layers. The 1934-1938 avalanche records indicate the importance of shock in avalanche release.

SIP U6432

Kalitin, N. N.
AMOUNT OF DIFFUSE ATMOSPHERIC RADIATION IN THE ARCTIC. (O velichinakh rasseyannoy radiatsii atmosfery v Arktike; Text in Russian with English summary). Arctica, 4:121-135 incl. illus. tables, graphs, 1936. 6 refs.
DLC, G600.A75, v. 4

Little direct sun radiation reaches the earth's surface in the arctic owing to cloudiness. Diffuse radiation is largely due to low cloud density and increased albedo of clean snow cover and ice. Diffuse radiation per sq. cm. was 523 and 541 cal. in Mastyr (Lena River estuary) on May 21 and 22, 1933 at a constant cloudiness of 10 St. Actinometric data are furnished for the evaluation of meteorological and hydrological processes in the arctic. Instruments measuring diffuse radiation are briefly described.

SIP U6433

Gunn, K. L. S. and others
RADAR EVIDENCE OF A GENERATING LEVEL FOR SNOW. Sci. Rept. MW-13, McGill U. MacDonald Physics Lab. 17p. incl. illus. diagrs. July 1953. 3 refs. (Contract No. AF-19[122]-217)
DWB, Unclassed

Vertical section radar observations of precipitation for 22 winter days during 1951-52 were related to upper air data. Little signal and practically no pattern were observed on 3 days. Well-defined snow trails with generating elements were visible on 13 days with stable air aloft, and parts of trails and less well-defined pattern were detected on 6 days with unstable air aloft. Instability is not the initiating mechanism, but confuses the pattern. A generating

level is evident at less than 2000 ft. above the frontal surface on stable days, and further above the frontal surface on unstable days. Average precipitation at the ground was the same on days with and without pattern. On patternless days snow crystals grow gradually in descending through cloud-free air at a saturation between that of ice and water.

SIP U6434

Smith, Arthur W.
A DETERMINATION OF THE HEAT OF FUSION OF ICE. Phys. Rev. 17:194-232 incl. tables, diagrs. Oct. 1903. 12 refs.
DLC, QC1.P4, v. 17

Small pieces of ice previously cooled several degrees below 0°C were weighed and transferred to a calorimeter containing kerosene oil cooled to the same temperature. The calorimeter and contents were heated slowly to -1°C by a small electric current. A larger current was then used long enough to melt the ice and heat the water to 0.5°C. The calorimeter, the electrical arrangements and the manipulation of the ice, are described. The sources of probable error are discussed. All measurements taken and the calculations made in the 8 determinations of the heat of fusion are tabulated. A weighted mean of 334.21 j. with a probable error of 0.08 j. is derived for the heat of fusion of ice, taking the value of the Clark cell as 1.434 v. at 15°C, or a value of 79.896 mean cal.

SIP U6435

Thompson, Stanley F.
CONSTRUCTION IN PERMAFROST. Western Construction, 28, No. 10:63-65 incl. illus. Oct. 1953.
DLC, TA1.W44, v. 28

A new type of permafrost with gravel particles separated by ice layers to an extent that appreciable settlement will occur upon thawing was encountered at Ladd Air Force Base (Alaska). This formation cannot be detected by auger or drills but is always associated with loose openwork gravel. Excavation seems to be the only remedy to construction failure. General construction methods used in permafrost areas are reviewed. Silt is removed by ripping, thawing and/or blasting. Frozen gravels are thawed and compacted under certain conditions. Construction on the undisturbed permafrost is resorted to when the silt is too deep for economical removal. The most successful method is artificial refrigeration. The most often used but least successful is the rigid floating slab method.

SIP U6436

Work, R. A.
STREAM-FLOW FORECASTING FROM SNOW SURVEYS. U. S. Dept. Agr. Circular No. 914, 16p. incl. illus. graphs, March 1953.
DLC, GB2401.W6, 1953

Snow surveys provide an index to the snow accumulation over a watershed, the total seasonal flow volume and aid in estimating peak flows. Analysis of volume and peak flow data for streams draining several western watersheds show a consistently positive trend in relationships between volume and flow. The meteorological conditions contributing to excessive run-off are discussed.

SIP U6437

Meier, Mark F.
FURTHER STUDIES OF THE DINWOODY GLACIERS, WIND RIVER MOUNTAINS, WYOMING. Am. Alpine J. 8:489-492 incl. diagr. 1953. 3 refs.
DLC, G505.A47, v. 8

The balance sheet of accumulation and ablation was strongly negative in 1952, the opposite extreme from 1950. Ablation exceeded accumulation in 57% of the glacier surface. Thinning and recession have been continuous at lower elevations with concurrent high-level snow-field thickening. The sedimentary and structural features of the glaciers were mapped to gain an insight into the manner of flowage. The sedimentary bands are pushed downhill fastest in the center of ice streams. The cyclic nature of the sedimentary layers suggests that they represent annual snow accumulations. The average distance between annual bands is 29 ft.

SIP U6438

Germany. Luftgau-Moskau
THE WINTER IN CENTRAL RUSSIA. (Der Winter in Mittelrussland; Text in German). 11p. appendices 1-22 incl. graphs, maps, [1943].
DWB, File No. 2738

Wind, air temperature, snow depth, frost penetration, thaw and flood data for various stations are analyzed and graphed. The data were obtained from Russian observations dating back to 1891. The snow cover maintains a loose texture until March and snowdrifts are prevalent. The snow cannot be compacted by rolling even at low temperatures. The snow crystals are merely compressed by the weight of the roller, producing a snow dust which drifts easily.

SIP U6439

Germany. Reichsamt für Wetterdienst (Luftwaffe). Klimainstitut Minsk
FROST PENETRATION IN THE CENTRAL SECTOR OF THE EASTERN FRONT. (Die Bodenfrosttiefe im Mittelabschnitt der Ostfront; Text in German). 10p. tables, graphs, map, Nov. 1943. (typed ms.)
DWB, File No. 2738

The most important influences on frost penetration are discussed and explained on the basis of observations made in the winter of 1942-43 in comparison with long-period means. Included are surface effects, beginning and depth of snow cover, water content of the soil as a function of the soil type, soil structure, the precipitation before the start of frost and the climate. The thawing process is analyzed,

and the thawing speeds of various soils are indicated. The thermal capacity and conductivity of various soil materials and types are tabulated. Graphs of frost penetration as a function of air temperature and snow depth are given for various stations.

SIP U6440

MEMORANDUM ON GROUND FROST IN THE EASTERN AREAS. (Merkblatt über Bodenfrost in den Ostgebieten; Text in German). Inspekteur der Ostbefestigungen, Abt. Geol. 4p. appendix, [1943]. (typed ms.)
DWB, File No. 2738

The effects of soil type, moisture, snow density, terrain, and ground cover on frost penetration are explained. General concepts concerning the beginning of freezing and thawing and frost duration are presented. The coexistence of various frost layers in the ground, frost and thaw damages are discussed. Frost penetration data for Moscow, Orel, Kasan, Kiev, Poltava, Rostov, and Elisavetgrad into snow-covered ground are appended.

SIP U6441

THE ICE COVER OF THE DNEPR. SNOW DEPTHS IN THE AOK 8 SECTOR. (Die Eisdecke des Dnjepr. Schneehöhen im Abschnitt des AOK 8; Text in German). [Wehrgeologenstelle 15], Supplements 6 & 7, 2p. tables, [1943]. (typed ms.)
DWB, File No. 2738

Ice cover thicknesses of the Dnepr River near Kremenchug (USSR) for Dec.-March during a warm winter (1938-39), an average winter (1932-33), and a severe winter (1927-28) are given. The bearing capacity of the homogeneous ice cover varies from 3.5 tons for 20-25 cm. thickness to 60 tons for thicknesses above 60 cm. The mean and maximum snow-cover depths for the area southeast and northwest of Kremenchug are tabulated.

SIP U6442

Becksmann
JUDGEMENT ON FROST PENETRATION DEPTH IN THE STALINGRAD-DON AREA. (Gutachten über Tiefe des Bodenfrostes im Raum Stalingrad-Don; Text in German). Wehrgeologenstelle (25), A.O.K. 6/A. Pi. Fu. Az. 39 Geol. 10a Nr. 265/42, 1p. incl. tables, Oct. 12, 1942. (typed ms.)
DWB, File No. 2738

Observations of frost penetration from 1924-1930 are analyzed. The mean frost penetration is 0.5 m. at the end of Nov., 1.0 m. at the beginning of Jan., and 1.5 m. at the beginning of Feb.

SIP U6443

Kühn
GROUND FROST IN THE KIEV-POLTAVA-KHAR'KOV-DON REGION. (Bodenfrost im Gebiete Kiew-Poltawa-Charkow-Don; Text in German). Wehrgeologenstelle 25, Az. 39 Geol. 10g Nr. 127/41, 1p. table, Nov. 20, 1941. (typed ms.)
DWB, File No. 2738

The area consists of loess beneath a black earth layer. Temperature and snow-cover depth determine the variations in frost penetration. Data from 7 successive winters with a snow cover show frost penetration to 40 cm. during 3 winters in Kiev, and to 50 cm. in 7 winters in Poltava. Water lines must be placed at least 2 m. below the surface.

SIP U6444

Germany. Luftgau-Moskau
SPRING AND SUMMER IN CENTRAL RUSSIA. (Frühling und Sommer in Mittelrussland; Text in German). Luftgau-Moskau, IW. Armeeoberkommando 9, Ia/Mess Nr. 370/43, 8p. appendices 1-14, tables, graphs, maps, March 17, 1943. (typed ms.)
DWB, File No. 2738

The snow cover attains its greatest depth at the beginning of March, and disintegrates steadily thereafter. The retreat of the snow cover towards the northeast is characteristic for all years. The earliest and mean dates of river ice breakup and flood conditions are plotted. Snow-cover depths and frost penetration for the Smolensk area in 1933-34 are graphed.

SIP U6445

Schulz
PRELIMINARY REPORT ON GROUND FROST OBSERVATIONS AND SPRING THAW FOR 1942-43. (Vorläufiger Bericht über die Beobachtungen des Bodenfrostes und der Verschlammung für 1942/43; Text in German). Wehrgeologenstelle (20) beim General d. Pioniere Heeres gruppe Mitte, Az.: 39 Geol. 10g, Nr. 638/43, 2p. appendices 1-10, tables, graphs, June 23, 1943. (typed ms.)
DWB, File No. 2738

Air temperature, precipitation, and frost penetration data for Smolensk, Katyn, Orsha, Gorki, and Vitebsk (USSR) are tabulated and graphed. Frost penetration data for areas southeast and northeast of Smolensk are also given.

SIP U6446

Wieleitner, H.
SNOW AND ICE OF THE EARTH. (Schnee und Eis der Erde; Text in German). Leipzig, Philipp Reclam jun., 1913, 198p. incl. illus. diagrs.
DLC, QE576.W5

The influences of snow and ice on the appearance and

the changes of the earth's crust are depicted, and the causes for this influence are explained. Snowfall, snow cover, firn line, avalanches, penitent snow, glacier ice, icebergs, sea ice, and ice caves are discussed. An analysis is made of glaciers, including extent, movement, melting, banding, and variations.

SIP U6447

Germany. Oberkommando der Kriegsmarine
THE NATURAL CONDITIONS OF THE SIBERIAN SEA ROUTE... (Die Naturverhältnisse des Sibirischen Seeweges...; Text in German). Hamburg-Altona, 1940. 169p. incl. illus. tables, graphs, maps, diagrs.
DLC, GB2595.G4, 1940a

The climate and weather, the properties and movements of the sea, ice phenomena, and the development of shipping along the Siberian sea route are discussed. The salinity, thermal properties, and strength of the arctic pack ice, fast ice, and drift ice are treated. The extent and distribution of ice from the Barents Sea to the Bering Strait during each year from 1929-1938 are presented.

SIP U6448

Barnes, Howard T.
ENGINEERING FEATURES IN BREAKING THE ALLEGHANY ICE GORGE... Eng. J. 9:453-461 incl. illus. graph, appendices A, B, Nov. 1926.
DLC, TA1.E584, v. 9

The ice conditions prevailing before the clearing work was planned are described. Dynamite was used to dislodge the foot of the pack; $CaCl_2$ to open channels in the surface ice near the bridges; ashes, mixtures of sand and gravel to absorb solar radiation and promote ice melting. Thermit was used at critical points in the old pack. Thermit operations which were effective in removing the ice gorge and prevent floods are described in detail. A discussion of the nature of the Thermit-ice reaction is appended.

SIP U6449

Mecking, Ludwig
THE ICE DRIFT FROM THE BAFFIN BAY AREA AS CONTROLLED BY CURRENT AND WEATHER. (Die Eistrift aus dem Bereich der Baffin-Bai beherrscht von Strom und Wetter; Text in German). Berlin, Ernst Siegfried Mittler u. Sohn, Jan. 1906, 135p. incl. tables, graphs, maps. [80] refs.
DLC, GB2595.M48

A comparison is made between the effects of current and wind on drift ice as based on theoretical calculations and empirical data. The current and wind conditions are analyzed separately, and their influence on the drifting ice is established. A uniform map of current distribution is obtained from the general behavior of drift ice, and the weather conditions with respect to the ice masses are determined by obtaining laws for the main ice types: glacier and sea ice. Both laws are described mathematically and graphically. The various types of drift ice are indicated and defined.

SIP U6450

Renaud, André
SWISS GLACIERS. (Schweizer Gletscher; Text in German). Bern, Verlag Paul Haupt, [1949], 43p. incl. illus. 2 refs.
DLC, GB2523.R4

The alpine climate and the formation of glaciers are discussed. A general analysis is made of firn characteristics, the extent of glacier tongues, melting and formation of the glacier surface, ice caves, glacial brooks, and glacier variations. Illustrations depicting characteristic glacier formations are included.

SIP U6451

Laffoley, L. H. and George B. Coffey
RADIANT-HEATED PLATFORMS. Ry. Eng. and Maintenance, 43:1228-1229, Dec. 1947. (What's the answer?)
DLC, TF1.R58, v. 43

The use of radiant heating for melting snow on platforms and driveways, and special problems involved are discussed. Snow removal by radiant heating at most stations in Canada is impractical and uneconomical. One-in. and slightly larger pipe on 18-in. centers, using water at 140°-160°F will be generally satisfactory in areas where this method is feasible. A water system is considered best as it permits the use of an anti-freeze and thus intermittent operation of the system.

SIP U6452

Erlenbach, Lutz
FROST AND THAW DAMAGES ON ROADS AND PREVENTIVE MEASURES. (Frost und Tauschäden an Strassen und Massnahmen zu ihrer Verhütung; Text in German). Strasse u. Verkehr, 39:359-363 incl. illus. graphs, diagrs. Sept. 25, 1953.
DLC, TE3.S755, v. 39

The differential behavior of non-binding and binding soils during freezing and thawing was studied in the laboratory. Heaving and settling temperature variations within the soil samples, and water movement within the sand and silt samples during the 10-day experiment are graphed. A frost insulating layer consisting of pure sand, and constructed on a flat, inclined plane with side drainage is recommended for frost prevention in roads, building foundations, and driveways. A frost insulating layer, 0.40-0.60 m. thick, beneath a 0.20-m. concrete pavement is sufficient to prevent damages in areas where frost penetrates 1.50-1.80 m. The effect of a wheel load on an elastic and a rigid pavement during the thaw period is depicted.

SIP U6453

Vial, A. E. Lockington
ALPINE GLACIERS. London, Batchworth Press, 1952, 126p. incl. illus. diagrs.
DLC, GB2401.V5, 1952

The general characteristics of glaciers, including their formation, location, glacier movement and rate of flow, are described. Glacial photography is briefly discussed. A lens hood for taking photographs against the sun and an X_2 or X_3 yellow filter are recommended. Half and full page photographs of glaciers and special glacial features are given.

SIP U6454

OBSERVATIONS ON GROUND FROST AND THAW PROCESSES IN TRENCHES IN LOESS-LOAM. (Beobachtungen über Bodenfrost und Auftauvorgänge in Kampfgräben im Lösslehm; Text in German). 1p. diagrs. [1943]. (typed ms.)
DWB, File No. 2738

Observations of frost penetration into trenches were made in the Orel region (USSR). Frost penetrated 2.6 m. from the surface into trenches 1.6 m. deep in mid-March. The frost penetration outside the trenches was 1.3 m. Deep frost penetration into trenches regardless of their wind-protected location is attributed to the lack of a protective plant cover on the walls and base, absence of a snow cover, an ice coating on the walls and compacted snow on the base, and the retention of cold air within the trench during the winter.

SIP U6455

Waarum, K.
MAINTENANCE OF WINTER ROADS IN NORTHERN NORWAY. (Vintervåghållningen i Nord-Norge; Text in Swedish). Svenska Vägförening. Tid. 23:434-448 incl. illus. graph, diagrs. Dec. 1936.
DPR, Unclassed periodical

Wind is responsible for the severe snow conditions in Troms canton (9 m. high snowbanks on highways June 20, 1934). Accumulating types of snow fences (used in the lowland) are more effective when placed parallel to the road at a distance 5-7 times the height of the fence and so placed that 2 directions of wind coming in from the same side of the road will counteract snowdrifts. The sectional type used in mountain regions gives better results when placed at a 30° angle with the prevailing wind. The sections are loosely trussed with wire to take the impact of wind flexibly. Experience shows that a space of 8 cm. between the 4 to 5-in. horizontal boards helps distribute the drifting snow. The frequency of avalanches (up to 50 times a winter) from the Poll mountain is presented graphically. Snowplows and 3-axle trucks for snow removal, and the adjustment of snow chains and air pressure in tires are also discussed.

SIP U6456

Benner, J.
CALENDAR FOR FROST, SNOW AND MUD. (Kalender für Frost, Schnee und Bodenverschlammung; Text in German). Feldluftgaukommando 27 - Der Leiter des Bauwesens B III 12 (Wehrgeologie), 1p. graph, Sept. 20, 1943. (typed ms.)
DWB, File No. 2738

Graphs indicating the beginning of frost, duration of a homogeneous snow cover, and the thaw period for the airfields of Machulichi, Dukudovo, Polotsk, Ovruch, and Kosniki (USSR) are presented. The data is based on long-period mean values.

SIP U6457

[CLIMATOLOGICAL DATA FOR 8 CARPATHIAN MOUNTAIN PASSES]. Aussenstelle-Wehr-Geol. St. 6, Suppl. 1-8, graphs, [1944].
DWB, File No. 2735

Monthly mean, mean and absolute minimum air temperatures, precipitation, days with snowfall and snow cover, maximum snow depth, and mean snow depth are plotted from Oct.-May for 8 Carpathian mountain passes.

SIP U6458

DURATION OF SNOW COVER AND SNOW DEPTH IN THE CARPATHIAN AREA. (Dauer der Schneebedeckung und Schneehöhe im Karpatenraum; Text in German). Wehrgeologenstelle 16, Nr. 585/44, Oct. 7, 1944. (graph)
DWB, File No. 2735

The duration of the snow cover at 33 Carpathian stations from Oct.-April is graphed and mean and maximum snow depths are given.

SIP U6459

Becksmann
JUDGEMENT ON CLIMATIC, RIVER, AND GROUND CONDITIONS NEAR KIEV ON THE BASIS OF SEASONAL VARIATIONS. (Gutachten über Klima-, Fluss- und Bodenverhältnisse bei Kiew in ihren jahreszeitlichen Schwankungen; Text in German). Wehrgeologenstelle 25 beim Höheren Pionierführer 14, Az. 39 Geol. 10g Nr. 546/43, 3p. graph, Sept. 17, 1943. (typed ms.)
DWB, File No. 3230

A graph is presented showing mean daily temperatures (1881-1915), mean precipitation amounts (1891-1915), maximum daily precipitation (1931-1940), mean snow depths (1891-1915), water level variations of the Dnepr River, frequency of high-water levels during 63 yr., ice cover thicknesses and bearing capacities, duration of the ice cover, and ground thaw periods.

SIP U6460

CLIMATOLOGICAL DATA FOR WEATHER CONDITIONS IN WINTER IN THE AREA OF THE SOUTHERN ARMY GROUP. (Klimatologische Daten für den Witterungszustand im Winter im Bereich der Heeresgruppe Süd; Text in German). Oberkommando der Heeresgruppe Süd Abt. Koluft/Ia, 4p. incl. tables, Dec. 14, 1941. (typed ms.)
DWB, File No. 3230

Climatic data of 20 to 30-yr. observations in the Kharkov-Mikhailovka-Pugachev area of southern European USSR are presented. Included are dates of river freeze-up, snow depths, dates of thaw beginning, and hardening and drying of the ground. The ground is unfavorable for military operations from Dec. 30-April 20. The most unfavorable period is from Jan.-March when snowstorms prevail 8-12 times during each of these months.

SIP U6461

SNOW DEPTHS IN THE H. G. SOUTH AREA. (Schneehöhen im Gebiet der H. G. Süd; Text in German). Suppl. 5 to Gen. d. Pi./Obkdo. H. Gr. Süd, Az.: 39 Geol. 10g Nr. 330/43, 1p. maps, Nov. 1, 1943.
DWB, File No. 3230

Maps showing mean and maximum snow depths and mean number of days with snowfall for southern European USSR are presented.

SIP U6462

Stern, Walter
ATTEMPT TO MEASURE GLACIER ICE THICKNESS ELECTRODYNAMICALLY. (Versuch einer elektrodynamischen Dickenmessung von Gletschereis; Text in German with English and French summaries). Gerlands Beitr. Geophys. 23:292-333 incl. illus. tables, graphs, diagrs. 1929. 6 refs.
DLC, QC801.B3, v. 23

Investigations are described to determine the applicability of the capacity method, based on electromagnetic oscillations, for measuring glacier ice thicknesses. The theory of electrodynamic depth determination of a layer electrically differentiated from its surrounding is developed. Measurements made by the capacity method on the Hochvernagtferner in 1927 and 1928 are described. A resonance and a surge method of measuring the capacity changes of a conductor caused by varying ice thicknesses were used. A description of the instruments used including circuit diagrams is included. The applicability of the method was confirmed, and its use for inland ice measurements is suggested. (See also SIP U696)

SIP U6463

Petrovskiĭ, A. A.
ELECTROMETRIC METHODS OF DETERMINING THE DEPTH OF PERMAFROST. (Elektrometricheskie sposoby opredeleniîa glubiny zaleganiîa vechnoĭ merzloty; Text in Russian). Materialy Komissii po Izucheniîu Estestvennykh Proizvoditel'nykh Sil Soîuza, No. 80:177-184 incl. graphs, 1930. 5 refs.
DLC, HC331.A6, 1930

Contours of permafrost are determined by seismometric or ondometric methods. The ondometric method is based on the principle of either radiation, reflection or interference. Each principle is briefly described. The interference method is preferred because simpler measuring devices are used. This method uses electromagnetic waves of inclined incidence which are only slightly absorbed by the soil. Dielectric and specific conductivity constants of frozen and unfrozen soil must be determined in the laboratory as well as in the field.

SIP U6464

T̂Sytovich, N. A.
PERMAFROST AS A FOUNDATION FOR CONSTRUCTION. (Vechnaîa merzlota kak osnovanie dlia sooruzheniĭ; Text in Russian). Materialy Komissii po Izucheniîu Estestvennykh Proizvoditel'nykh Sil Soîuza, No. 80:185-200 incl. tables, graphs, diagrs. 1930.
DLC, HC331.A6, 1930

Soil structure, temperature and soil water content are the basic factors on which detrimental heaving may be estimated in permafrost regions. These factors are evaluated theoretically and empirically by measuring the adfreezing strength of frozen ground to foundation material and estimating the compression strength of sandy and clayey soils. Tables indicate the compression strength of cubic samples of various soils ranging from 20-152 kg./sq. cm. at temperatures of -12°, -20°C and less and containing 5.39-24.00% water. Sandy soils under natural conditions increase in compression strength with increased water content; clayey soils decrease in compression strength under the same conditions. A soil classification is devised based on the influence of soil structure on compression strength at -12°C and 12% moisture content.

SIP U6465

Malmgren, Finn
STUDIES OF HUMIDITY AND HOAR-FROST OVER THE ARCTIC OCEAN. RESULTS FROM THE "MAUD" EXPEDITION. Geofys. Publikasjoner, 4, Nr. 3:3-20 incl. tables, graphs, diagrs. 1927. 1 ref.
DLC, QC801.N67, v. 4

A thermopsychrometer was used to measure humidity over the Polar Sea, and a balance type, cylindrical hoarfrost recorder measured hoarfrost over the Arctic Ocean. Results of humidity measurements show that the relative humidity over ice remains near

100% during the winter. The hoarfrost records indicate that hoarfrost generally forms when the relative humidity over ice exceeds 100% but never when it is less than 100%. The amount of hoarfrost is dependent on the relative humidity over ice, the air temperature, and the wind speed. The probability of hoarfrost formation decreases rapidly with increasing wind speeds. The amount of hoarfrost is greatest at -28° to -29°C.

SIP U6466

Dücker, Alfred
INVESTIGATION OF FROST DAMAGES BY REMOVAL OF UNDISTURBED FROST CORES. (Untersuchungen an Frostschäden durch die Entnahme ungestörter Frostkerne; Text in German). Strasse u. Autobahn, 4:288-299 incl. illus. tables, graphs, diagrs. Sept. 1953. 13 refs.
DLC, TE3.S752, v. 4

A method of removing undisturbed soil frost cores by means of a rotary drill is described. The method was used to remove cores from a frost-susceptible road during breakup in order to study the conditions leading to frost damages. The climatic conditions of the winter 1951-52, the geological features of the area, the soil types and their physical properties, and all factors effecting frost heaving are analyzed and correlated. It is shown that the locally limited occurrence of frost damages is conditioned by the hydrogeological conditions which are encountered in the roadbed during fall after the precipitation period. The possibility of predicting the behavior of a pavement in spring with respect to frost breakup by simple water content determinations in late fall is indicated.

SIP U6467

Pokrovskiĭ, G. I. and V. G. Bulychev
HEAT CONDUCTIVITY OF SOILS. (O teploprovodnosti gruntov; Text in Russian). Zhurnal Tekhnicheskoĭ Fiziki, 8:1576-1583 incl. tables, graphs, diagr. 1938. 11 refs.
DLC, QC1.Z48, v. 8

The coefficient of thermal conductivity for frozen and thawed soils was approximated theoretically. The values vary from 0.41 and 0.51 kcal./hr. m. °C for thawed and frozen soil respectively at a water content of 10% to 0.73 and 1.05 kcal./hr. m. °C at a water content of 40%. Experimental values are tabulated. The smaller values obtained by other investigators are due to neglecting the abrupt temperature changes at the interface of various media. The difference between the coefficient for sandy and clayey soils is negligible for practical purposes. The water content has a considerable influence on the coefficient in frozen sandy soil.

SIP U6468

APPLYING ROCK SALT TO CURE HEAVING TRACK. Ry. Eng. and Maintenance, 43:144, Feb. 1947.
DLC, TF1.R58, v. 43

Rock salt is applied in late summer or early fall to ballast at locations where heaving has occurred. The salt should be applied to the location of the hump of the heaved section and in the same thickness as the thickest shim that has been used, up to a maximum of 3 in. Salt may be spread on top of the ballast, placed in 24-in. conical holes in the ballast, or the ballast may be removed, the salt spread, and the ballast replaced.

SIP U6469

Barnhart, E. H. and G. S. Crites
FROST ACTION IN BALLAST. Ry. Eng. and Maintenance, 42:1084, Oct. 1946. (What's the answer?)
DLC, TF1.R58, v. 42

Uniform frost action in ballast is attained through adequate drainage. The ballast, whether hard or soft, should be porous and laid on a compacted subgrade of adequate slope. Poor drainage under the ballast section can be remedied by placing a subballast of pervious material (engine cinders) below the frost line to prevent water freezing in the subgrade.

SIP U6470

Wyer, R. F.
THAWING FROZEN WATER PIPES WITH ARC-WELDING UNITS. Ry. Eng. and Maintenance, 42:1297, 1305 incl. tables, Dec. 1946.
DLC, TF1.R58, v. 42

Electric welding equipment has been used successfully for thawing frozen water pipes. Current, thawing time, cable sizes and resistances for different pipe sizes are tabulated. The most suitable current has been found to be 200-500 amp. Thawing time depends on the pipe and its location, condition of the surrounding soil, extent of the freeze and air temperature. Instructions for using the equipment are given.

SIP U6471

MACHINES KEEP TERMINALS OPEN IN WINTER ON THE C. P. R. Ry. Eng. and Maintenance, 42:1294-1296 incl. illus. Dec. 1946.
DLC, TF1.R58, v. 42

Organization and methods for keeping terminals of the Canadian Pacific Railroad operating in winter are given with particular reference to procedures followed at Montreal. Most of the snow is loaded by the Sicard snow-blower or by the Barber-Greene loader. Hart ballast cars are used for snow disposal work. Snow-melting pits are constructed of old bridge ties, lined with car sheathing, and equipped with perforated steam pipes and an outlet. Live steam at about 90-lb. pressure is used for melting purposes.

SIP U6472

Glosup, V. E.
WIDENING CUTS FOR SNOW. Ry. Eng. and Maintenance, 42:1312-1313, Dec. 1946. (What's the answer?)
DLC, TF1.R58, v. 42

The practicability of widening cuts or flattening cut slopes to prevent snow accumulation is discussed. Vertical or nearly vertical slopes are more desirable than flat slopes through the Dakotas and eastern Montana. As a general practice, slopes of deep cuts are not changed; slopes of shallow cuts are flattened to an angle of 30° and the foot of the side slopes set back several feet from the normal roadbed. Deep cuts should be widened and under normal conditions may be widened to 2.5 times their heights, measuring from the center line of the nearest or outside track.

SIP U6473

Werenskiold, W.
FROZEN EARTH IN SPITSBERGEN. Geofys. Publikasjoner, 2, No. 10:3-10 incl. graphs, 1922. 1 ref.
DLC, QC801.N67, v. 2

A theoretical explanation of the peculiar distribution of permafrost in Spitsbergen is presented. Frozen soil continues for some distance under the sea; the upper limit slopes down more rapidly than the beach, and disappears farther out under the sea. Equations are derived for the temperature distribution. (See also SIP U5409)

SIP U6474

Köhler, Hilding
THE CONDENSATION OF WATER VAPOR IN THE ATMOSPHERE. FIRST REPORT. (Zur Kondensation des Wasserdampfes in der Atmosphäre. Erste Mitteilung; Text in German). Geofys. Publikasjoner, 2, No. 1:3-15 incl. table, graph, 1921. 7 refs.
DLC, QC801.N67, v. 2

Fog particles in mountain deposits were chemically analyzed to determine condensation nuclei in clouds. Droplet sizes are calculated for various normal solutions which must exist in saturated air in every solution. It is shown that clouds with different droplet sizes yield almost the same quantity of salt, and it is concluded that the droplets have developed from salt particles of various sizes. Observations made over a period of 5 yr. indicate that supercooled water droplets generally exist up to a specific temperature limit (-15°C). This supercooling is attributed to the presence of salt particles in the water which lower the f.p.

SIP U6475

Köhler, Hilding
THE CONDENSATION OF WATER VAPOR IN THE ATMOSPHERE. SECOND REPORT. (Zur Kondensation des Wasserdampfes in der Atmosphäre. Zweite Mitteilung; Text in German). Geofys. Publikasjoner, 2, No. 6:3-53 incl. illus. tables, graphs, 1922. [25] refs.
DLC, QC801.N67, v. 2

The possibility of supersaturation over ice in the presence of salt solutions in a non-supercooled state is shown mathematically, and confirmed experimentally. The general existence of water droplets in the Mg Na-zone to -28°C is indicated. The microscopic examination of snow crystals and ice fog deposits is described. The dissolution of water clouds by snow formation is explained, and the significance of water in crystals, change of droplet size, and Cl-content in snow masses on supercooling of atmospheric water droplets is analyzed. A mathematical analysis is made of droplet size distribution and the existence of specific condensation nuclei within each size group. Definitions of ice fog deposits including rime, air hoar, and an intermediate deposit (Rauhfrost) are appended.

SIP U6476

Jakuschoff, P.
ON ANCHOR ICE, ICE JAMS AND MEASURES FOR COMBATING THEM. (Über Grundeis, Eisstauungen und Massnahmen zu ihrer Bekämpfung; Text in German). Mitt. Inst. Wasserbau tech. Hochschule Berlin, No. 19:1-32 incl. illus. tables, graphs, map, diagrs. 1934. [100] refs.
DBS, TC1.B4, No. 19

Fundamentals on the structure of water and ice, various ice types, and ice-cover growth are discussed. A historical summary and the various theories of anchor ice formation are presented. Examples of a freezing process and ice jam on the Neva River (USSR), the winter regime of the Volkhov River (USSR), and the ice conditions on the Narva and Svir' rivers are given. Various methods for combating ice jams are described. Factors which cause anchor and frazil-ice formations are sudden decrease of air temperature below 0°C, ice-free surfaces, intensive mixing of the water masses, and heat losses at the water surface by wind, evaporation, and irradiation.

SIP U6477

Ångström, Anders
SOIL TEMPERATURE IN FORESTS OF DIFFERENT DENSITIES. (Jordtemperaturen i bestånd av olika täthet; Text in Swedish with English summary). Statens Meteorologisk-Hydrografiska Anstalt, Medd., Serien Uppsatser, No. 5:187-218 incl. illus. tables, graphs, diagrs. [1936].5 refs.
DLC, QC852.S85, No. 5

Soil temperatures were observed weekly at 15-, 30- and 45-cm. depths from Sept. 1925-Sept. 1930 in 3

test plots of varying vegetative density. Monthly values of temperature and deviations resulting from vegetative denudation are presented in tables and the different values are statistically analyzed. Complete or partial denudation of vegetation produced a soil temperature higher by 2-3°C in summer, more rapid and earlier rise of temperature in spring, reduced frost penetration, and initial thawing 2-4 weeks earlier. These effects may be ascribed to increased radiation, and soil heat conservation through thicker snow covers.

SIP U6478

Bogdanovich, G. P.
ILLUMINATION BY SCATTERED LIGHT OF DIFFERENTLY ORIENTED VERTICAL SURFACES IN CASES WITH CLEAR SKY. (Osveshchennost' rasseĭannym svetom razlichnoorientirovannykh vertikal'nykh poverkhnosteĭ pri bezoblachnom nebe; Text in Russian with German summary). Zhurnal Geofiziki, 4:407-420 incl. tables, graphs, 1934. 3 refs.
DLC, QC801.Z52, v. 4

The results of illumination measurements made with a Schmidt and Haensh photometer at the Institute of Actinometry and Atmospheric Optics in Slutsk are tabulated and discussed. The coefficient of vertical illumination (ratio of vertical to horizontal illumination) was determined. The coefficient of vertical illumination is twice as high with a snow cover as with a vegetative cover. The coefficient increased with increasing sun altitude with a snow cover but decreased with a vegetative cover.

SIP U6479

Leduc, A.
HEAT OF FUSION AND DENSITY OF ICE. J. Phys. 4th Ser., 5:157-165 incl. diagrs. March 1906. 2 refs.
DLC, QC1.J8, v. 5

The difficulties in the determination of ice density caused by dissolved gases is discussed. Attempts at obtaining completely gas-free ice failed, but all experimental values obtained for the density of ice were larger than 0.9172 and increased with the removal of dissolved gases. Water subjected to prolonged boiling still retains about 1 cc. gas/l. A value of 0.9176 is estimated for the density of gas-free ice at 0°C. The heat of fusion of ice is 79.2 cal. when Bunsens' ice density value of 0.91674 is replaced with 0.9176.

SIP U6480

Dickinson, H. C., D. R. Harper 3d. and N. S. Osborne
LATENT HEAT OF FUSION OF ICE. Bull. Bur. Standards (U. S.), 10:235-266 incl. illus. tables, graph, diagrs. Feb. 20, 1914. 8 refs.
DLC, QC1.U5, v. 10

Hollow cylinders of ice weighing from 100-500 gm. were cooled to a uniform temperature of -0.72° or -3.78°C, weighed and placed in the water of the calorimeter. The electrical method and the method of mixtures were used to measure the heat of fusion of 92 ice samples and the results are tabulated. A mean of 79.65 cal. was obtained by the electrical method, 79.61 cal. by the method of mixtures. The difference between individual samples was not more than 1:1000.

SIP U6481

Waidner, C. W., H. C. Dickinson, and J. J. Crowe
OBSERVATIONS ON OCEAN TEMPERATURES IN THE VICINITY OF ICEBERGS AND IN OTHER PARTS OF THE OCEAN. Bull. Bur. Standards (U. S.), 10:267-278 illus. graphs, Feb. 20, 1914. 1 ref.
DLC, QC1.U5, v. 10

Sea-water temperatures were measured with electrical resistance thermometers and an L. and N. temperature recorder installed on the U. S. S. Chester and Birmingham in their patrol of the North Atlantic Ocean in June-July 1912. The records show that the temperature variations in parts of the ocean far removed from ice are often as great and sudden as in the neighborhood of icebergs. A fall of temperature of 1°-3°C and less was obtained over 4-5 mi. in most courses when approaching an iceberg. The character of the temperature variation varied with the direction of approach. The rise in temperature as a berg is approached was not observed as has been recorded by Barnes. The absence or proximity of a berg could not be detected from temperature records of sea water. The echo of the fog horn cannot be depended on to detect the presence of an iceberg. (See also SIP U6221)

SIP U6482

Beaulard, F.
THE DIELECTRIC CONSTANT OF ICE AND WATER NEAR 0°. (Sur la constante diélectrique de la glace et de l'eau au voisinage de 0°; Text in French). Compt. Rend. 144:904-906, April 29, 1907. 2 refs.
DLC, Q46.A14, v. 144

Pure water was enclosed in an ellipsoidal vessel of thin glass; freezing was induced with a CH_3Cl spray. The dielectric constant was 3.072 for water near the f.p., 1.455 for ice near the m.p., and from 1.987-2.586 for a mixture of ice and water. The dielectric constant of ice is of the order of magnitude of the square of the refractive index.

SIP U6483

Hudson, C. S.
THE FREEZING OF PURE LIQUIDS AND SOLUTIONS UNDER VARIOUS KINDS OF POSITIVE AND NEGATIVE PRESSURE AND THE SIMILARITY BETWEEN OSMOTIC AND NEGATIVE PRESSURE. Phys. Rev. 22:257-264 incl. diagrs. May 1906. 6 refs.
DLC, QC1.P4, v. 22

Thermodynamic methods were used to investigate the changes of the freezing temperature of water under various kinds of pressure exerted on one phase alone. The freezing temperature is lowered by 0.00748°C when the pressure on water and ice is increased by 1 atm.; it is lowered by 0.0899°C when the pressure is increased by 1 atm. on the ice alone; it remains unchanged when the increased pressure on water is 9 times greater than the increased pressure on the ice; it is raised by 0.0824°C when the pressure is increased by 1 atm. on the water alone. Ice in freezing solutions is under atm. pressure and the water is under atm. pressure altered by the pressure of the solute. Solutions are under a negative pressure identical to their osmotic pressure.

SIP U6484

Dill, Richard S.
THE FREEZING OF WATER IN PIPES AND VESSELS. Heating and Ventilating, 50, No. 10:96-101 incl. tables, graphs, diagrs. Oct. 1953.
DLC, TH7201.H4, v. 50

The conditions under which water freezing may burst containers were studied. Each of the containers tested had an open top and hence an exposed water surface. Containers insulated at the closed end developed a surface ice film which caused distortion or breaking. The ice film was pushed out of uninsulated pipes, permitting sufficient pressure relief. Distortion occurred in a section containing water; not in a section containing ice. The relative speed with which ice formed at the open end was the criterium for bursting.

SIP U6485

Raman, C. V.
THERMAL OPALESCENCE IN CRYSTALS AND THE COLOUR OF ICE IN GLACIERS. Nature, 111:13-14, Jan. 6, 1923. (Letters to the editor)
DLC, Q1.N2, v. 111

The blue opalescence of a block of clear ice free from inclusions when a cone of solar rays is passed through is attributed to atomic scattering of light. The blue color exhibited by glacier ice and icebergs is attributed to the same phenomenon. Blue opalescence is believed to be the real cause of the color of transparent ice observed under certain conditions. The absorption of light in traversing the medium tends merely to diminish its intensity and make it of a more saturated hue.

SIP U6486

Kuz'min, P. P.
DIRECT SOLAR RADIATION IN THE ZERAVSHAN MOUNTAIN REGION. (Priamaia solnechnaia radiatsiia v gornom Zeravshanskom raĭone; Text in Russian with English summary). Zhurnal Geofiziki, 5:222-236 incl. tables, graphs, 1935. 4 refs.
DLC, QC801.Z52, v. 5

A Michelson actinometer was used to record solar radiation at elevations of 1860-3710 m. during the summer of 1933. The results are discussed and some of the data are tabulated. Direct solar radiation is the important factor in glacier melting. Variations in solar radiation are reflected in variations in the rate of glacier melting. Thawing is often retarded during the morning hours as a result of radiational loss at night from the glacier surface to a highly transparent atmosphere.

SIP U6487

Zil'berman, A. N., A. P. Liubimov, and A. P. Bazhenova
OBSERVATIONS OF SOIL FREEZING AND THAWING BY ELECTRICAL CONDUCTIVITY. (Nabliudeniia zamerzaniia i ottaivaniia pochvy metodom elektroprovodnosti; Text in Russian with German summary). Zhurnal Geofiziki, 5:116-128 incl. tables, graphs, diagrs. 1935. 5 refs.
DLC, QC801.Z52, v. 5

The investigations at the Central Institute of Experimental Meteorology and Hydrology (Moscow) indicated that soil freezing may be studied through measurements of its electrical conductivity. Electrical resistance between electrodes placed in the soil as measured with a Kohlrausch bridge was found to vary widely between frozen and thawed soils. Resistance of thawed soil varied from 1000-7000 Ω with a 20-cm. electrode spacing according to composition and moisture content. The resistance increased markedly upon freezing. The Kohlrausch bridge may be replaced with a loudspeaker to permit audible indications of changes in soil state.

SIP U6488

Trofimov, A.
THE AIR PRESSURE VARIATIONS AND GASEOUS EXCHANGE IN THE SOIL. (Kolebaniia barometricheskogo davleniia v pochve i pochvennyĭ gazoobmen; Text in Russian with German summary). Zhurnal Geofiziki, 4:468-481 incl. table, graphs, diagr. 1934. 24 refs.
DLC, QC801.Z52, v. 4

Pressure differences between the atmosphere and soil air were determined at the Meteorological Observatory (Moscow) during 1932-1934. It was found that air pressure variations do not readily penetrate podzolic soil. These variations occur readily only in upper frozen soil layers and during dry summer periods. A higher air pressure was observed in soil immediately after precipitation. Laboratory investigations indicate that freezing of soil diminishes air permeability by 5-30%. The increased permeability of frozen soil in nature is probably related to structure processes resulting from freezing and thawing.

SIP U6489

Bastamov, S. L.
METHODOLOGY OF CLIMATOLOGICAL WORKS. (K voprosu o metodike sovremennykh klimatologicheskikh rabot; Text in Russian with French summary). Zhurnal Geofiziki, 4:262-275 incl. illus. diagr. 1934. 12 refs.
DLC, QC801.Z52, v. 4

Frost heaving occurred over 20,000 km. of railroads in the USSR as indicated through records from 1929-1933. Effective countermeasures consist of lowering the ground-water level, decreasing capillary rise, and reducing frost penetration. Frost penetration reached depths of 70-100 cm. along the Leningrad-Kiev Railroad and 200 cm. along the Leningrad-Tobol'sk line. The construction of slag beds in regions susceptible to heaving alleviated the condition successfully.

SIP U6490

Leont'evskiĭ, N. P.
IMPORTANCE OF THE FOREST SHELTER BELTS FOR INCREASE OF CROP YIELD. (Rol'drevesnykh zashchitnykh polos v povyshenii urozhaĭnosti; Text in Russian with German summary). Zhurnal Geofiziki, 4:128-140 incl. tables, graphs, diagrs. 1934. 5 refs.
DLC, QC801.Z52, v. 4

Forest shelter belts influence wind distribution within a distance of 20-30 times the height of the trees, prevent snowdrifts, and contribute towards a more even distribution of snow. The snow cover at Kamennaĭa Step' was 15 cm. deep in the open, 22 cm. in the forests, 89 cm. in front of the belts, and represented a corresponding water equivalent of 46-52, 64-80, and 116-251 mm. Graphs and tables indicate snow-cover distribution in relation to prevailing winds, soil moisture content, evaporation and soil temperatures in and near the shelter belts.

SIP U6491

Trofimov, A.
ILLUMINATION OF THE UPPER LAYERS OF AN ICE-COVERED SEA. (Podlednaĭa i podvodnaĭa osveshchennost' v verkhnikh gorizontakh moriĭa; Text in Russian with English summary). Zhurnal Geofiziki, 5:444-465 incl. illus. tables, graphs, map, 1935. 62 refs.
DLC, QC801.Z52, v. 5

Cupron cells were used to measure illumination in the green-blue in the Barents and White seas during 1933-34. These measurements to depths of 26 cm. are tabulated and discussed. Water transparency was measured under snow-covered polar ice (albedo 40-91%), snow-free ice, and ropak ice. Snow-covered arctic sea ice absorbs most of the light. The transparency of ice, 1 m. thick, varied from 3-37% depending on the thickness and albedo of the snow cover. Fresh ropak ice was almost 100% transparent.

SIP U6492

Pokrovskiĭ, G. I. and S. I. Sinel'shchikov
COMBINED METHOD OF DETERMINING THE ICE CONTENT OF THE SOIL. (O kombinirovannom metode opredeleniĭa l'dosoderzhaniĭa gruntov; Text in Russian). Zhurnal Tekhnicheskoĭ Fiziki, 8:1882-1888 incl. tables, graphs, diagr. 1938. 4 refs.
DLC, QC1.Z48, v. 8

The ice content of sandy and clayey soils may be determined by both the dilatometric and volumetric methods in the same apparatus. Comparative measurements are given; the differences seldom exceed 4%. The tests indicate that the ice content of clay depends largely on the soil water content.

SIP U6493

Mason, B. J.
ARTIFICIAL SNOW CRYSTALS SERVE IN THE STUDY OF ATMOSPHERIC PROCESSES. (Künstliche Schneekristalle dienen der Erforschung atmosphärischer Vorgänge; Text in German). Umschau, 53:15-17 incl. illus. table, Jan. 1, 1953. 3 refs.
DLC, AP30.U5, v. 53

Two methods of producing snow crystals in the laboratory are described. The first method consists of growing crystals in a cloud of small, supercooled water droplets under conditions closely related to those in natural clouds. Crystals may also be developed in a state of rest on glass or metal surfaces. The external appearance of the snow crystals grown in the water cloud shows a marked dependency on temperature and degree of supersaturation. A dual transition between thin hexagonal plates and hexagonal prismatic columns occurs from 0° to -40°C. Experiments with crystals grown on metal plates indicate the frequent occurrence of pyramidal forms at temperatures below -20°C. Piezo- or pyroelectricity of ice crystals could not be established. Experiments with crystallic prisms have shown that with a given constant temperature and constant supersaturation, the square of the linear dimensions is proportional to the time and that the proportionality factor increases with the degree of supersaturation.

SIP U6494

Rudolph, H.
THE ROLE OF ICE CLOUDS IN A THUNDERSTORM. (Die Rolle der Eiswolken beim Gewitter; Text in German). Meteorologische Z. 60:68-69, Feb. 1943. 7 refs.
DLC, QC851.M3, v. 60

Thunderstorm phenomena are the result of an extraordinary decrease of discharge potential by numerous fine points of charged ice crystals and splinters in ice clouds as compared to the lower effectiveness of water droplets. Thunderstorms are thus based on an avalanche-like multiplication of electric carriers of both signs as the result of ion push.

SIP U6495

Steinmetz, H.
THE CRYSTAL SYMMETRY OF ICE. (Die Kristallsymmetrie des Eises; Text in German). Z. angew. Mineral. 3:183-194 incl. illus. diagrs. 1941. 15 refs.
DLC, QE351.Z4, v. 3

The crystal symmetry of ice is analyzed morphologically. The existence of a polar axis is denied since no proof exists for the hemimorphy of ice. It is concluded that ice I belongs to the dihexagonal-bipyramidal symmetry class. The possibility of a ditrigonal class cannot be excluded.

SIP U6496

Findeisen, W. and E. Findeisen
INVESTIGATIONS CONCERNING ICE SPLINTER FORMATION ON RIME LAYERS... (Untersuchungen über die Eissplitterbildung an Reifschichten...; Text in German). Meteorologische Z. 60:145-154 incl. graph, diagrs. May 1943. 11 refs.
DLC, QC851.M3, v. 60

Ice splinters formed on a rimed body were observed during their descent in an electric field. The electrical properties of the splinters are calculated from the amplitude of their movement in the electric field. The results indicate that the splinters formed during the growth of a rime layer are predominantly negatively charged. Splinters with a preferred positive charge form during evaporation of a rime layer. The voltage of individual splinters varies considerably. The positive or negative temperature gradient in the rime layer is decisive for the sign of the splinter charge.

SIP U6497

Lange, Erich
POLARIZATION INFLUENCES ON VOLTAGE POTENTIALS OF RIME LAYERS ... (Polarisationseinflüsse auf Voltapotentiale von Reifschichten ...; Text in German). Meteorologische Z. 60:154-161, 303-314 incl. tables, graphs, diagrs. May, Sept. 1943. 32 refs.
DLC, QC851.M3, v. 60

Theoretical aspects of important basic types of polarization influences on voltage potentials are discussed. The sign of the displacements of the voltage potential of rime layers is dependent on the sign of the primary field and the conductivity of the adjacent air phase. Experiments were conducted to provide experimental proof for the presence of these sign variations under corresponding experimental conditions. The resistivity of an ice layer was determined experimentally and the dielectric constant of ice was found not to exceed 80 at low frequencies.

SIP U6498

Hudson, C. S.
APPLICATION OF THE HYPOTHESIS OF DISSOLVED ICE TO THE FREEZING OF WATER AND OF DILUTE SOLUTIONS. Phys. Rev. 21:16-26 incl. table, graphs, July 1905. 3 refs.
DLC, QC1.P4, v. 21

Cold water is considered as a solution of ice, the dissolved ice having a definite solubility with a definite equilibrium-concentration, both quantities varying independently with the temperature. The freezing temperature of pure water is the temperature at which the solubility equals the equilibrium concentration. The equality of the values for the free energy of freezing as determined by 3 methods indicates that the concentration of ice in a dilute solution is less than the concentration of ice in pure water at the same temperature. Dilute solutions have, therefore, lower f.p. and lower temperatures of maximum density than pure water.

SIP U6499

Volkov, I. I.
PECULIARITIES OF SPRING BREAKUP OF WESTERN SIBERIAN RIVERS ILLUSTRATED BY CONDITIONS OF THE TOM RIVER. (Osobennosti vesennego ledokhodnogo rezhima Zapadnosibirskikh rek na primere r. Tomi; Text in Russian with English summary). Zhurnal Geofiziki, 4:239-261 incl. illus. tables, graphs, diagrs. 1934.
DLC, QC801.Z52, v. 4

The Tom River was studied during 1932-33 and compared with normals. The river was selected as characteristic of the winter regime of navigable rivers in western Siberia. The geographical location of the river favors the formation of ice jams during autumn and spring. The northerly flow of the river causes more rapid spring breakup. The rivers of western Siberia frequently become navigable earlier than the Volga River located in a warmer climate.

SIP U6500

Elenevskiĭ, V. V. and G. A. Nizovkin
RAILROAD CONSTRUCTION UNDER PERMAFROST CONDITIONS. (Zheleznodorozhnoe Stroitel'stvo v Usloviĭakh Merzloty; Text in Russian). Moscow-Leningrad, Transzheldorizdat, 1936, 239p. incl. illus. tables, maps, diagrs. [100] refs.
DLC, TA710.E4, 1936

New construction methods in the regions of permafrost and deep frost penetration are reviewed. The significance and peculiar properties of permafrost for the northern regions of the USSR are stressed and soil classification, frost investigation, dynamics of the upper horizon of permafrost and mechanics of frost heaving phenomena are discussed. Special studies are required for dam, canalization and water-supply line construction.

SIP U6501

THE ICE COVER OF THE DNEPR NEAR NIKOPOL AND KHERSON. THICKNESS AND BEARING CAPACITY. (Die Eisdecke des Dnjepr bei Nikopol u. Cherson. Stärke und Tragfähigkeit; Text in German). Wehrgeologenstelle 12 b. Gen. d. Pi. H. Gr. A. Az.: 39 Geol. 10g Nr. 11/44, 1p. incl. graphs, Jan. 8, 1944.
DWB, File No. 2734

The ice thicknesses and bearing capacities are graphed for a mild winter (1938-39), an average winter (1932-33), and a severe winter (1927-28).

SIP U6502

BEGINNING DATES OF ICING AND BREAKUP ON THE RIVERS OF THE SOUTHERN ARMY GROUP. (Eintrittszeit der Vereisung und des Eisaufbruchs in den Flussgebieten der Heeresgruppe Süd; Text in German). Wehrgeologenstelle 16 b. Obkdo. H. Gr. Süd/gen. d. Pi. Az.: 39 Geol. 10g Nr. 320/43, 2p. incl. table, map, Sept. 17, 1943. (typed ms.)
DWB, File No. 2734

The data are based on observations from 1880-1941 at 104 observation stations throughout southern European USSR. The earliest, latest, and mean dates of icing and ice breakup are tabulated, and the mean beginning date of icing is mapped.

SIP U6503

MAXIMUM ICE THICKNESSES OF UKRANIAN RIVERS. (Maximale Eisdicken der ukrainischen Flüsse; Text in German). Geologische Vermittlungsstelle Ukraine, 4p. incl. tables, Sept. 1, 1943. (typed ms.)
DWB, File No. 2734

The ice thicknesses at the center of Ukrainian rivers at various locations and during different years are tabulated. The date of observation is included.

SIP U6504

[Finnisches Meeresforschungsinstitut. Helsinki]
ICE AND SHIPPING CONDITIONS IN THE WHITE SEA. (Eis- und Schiffahrtsverhältnisse im Weissen Meer; Text in German). 2p. table, maps, 1941. (typed ms.)
DWB, File No. 2734

Shipping is possible without ice-breaker aid from the end of May to beginning Nov. at Archangel. Maximum extent of icing is attained in Feb. and March, when the pack ice attains thicknesses of 2-3 m. and the fast ice 100-120 cm. Shipping is impossible during this time. Extensive ice-breaker aid is required up to mid-April.

SIP U6505

ICE CONDITIONS IN THE SEA OF AZOV. (Eisverhältnisse im Asowschen Meer; Text in German). W. Geol. St. 16, Nr. 288/43, map, [1941].
DWB, File No. 2734

The extent of the minimum fast-ice cover during mild winters, and fast ice during average and severe winters is mapped.

SIP U6506

THE ICE CONDITIONS NEAR KERCH AND IN THE NORTHERN SEA OF AZOV. (Die Eisverhältnisse bei Kertsch und im nördlichen Azowschen Meer; Text in German). Suppl. to A. O. K. 11, Ia/A. Pi. Fü. Nr. 5187/41 (Geol.), Az. 39 Geol. 10 Nr. 98/41, 1p. incl. table, [1941]. (typed ms.)
DWB, File No. 2734

Winter on the Kerch Peninsula is mild with average temperatures near 0°C and ice storms are frequent. The Kerch Strait does not freeze, but contains drift ice which penetrates the bay and blocks the port. Shipping is usually interrupted for 30 days. All ports on the Sea of Azov freeze because of the low salinity of the water. The icing of ports begins in Dec. and lasts until early March. Ice-cover thicknesses of 75 cm. are attained.

SIP U6507

GRAPHS OF DNEPR ICING. (Graphische Darstellung zur Dnjepr-Vereisung; Text in German). Geologische Vermittlungsstelle Ukraine, 1p. graphs 1-5, Sept. 6, 1943. (typed ms.)
DWB, File No. 2734

Characteristic dates of fall and spring ice conditions, and ice thicknesses at different river gages during the winter half-years 1927-1938, 1932-33, and 1938-39 are graphed.

SIP U6508

Deeley, R. M. and P. H. Parr
THE HINTEREIS GLACIER. Phil. Mag. 6th Ser. 27: 153-176 incl. tables, graphs, diagrs. appendix, Jan. 1914. 3 refs.
DLC, Q1.P5, v. 27

Glacier slip, shear stress, internal temperature, crevassing and viscosity are discussed. The bodily slip of the whole mass of ice on the glacier bed and the differential motion of the ice in the glacier were studied experimentally. The slip of clean ice upon a hard, slightly rough surface takes place without abrasion of ice or rock, and is probably due to melting and refreezing taking place where each irregularity of the glacier-bed projects into the ice. Temperatures between depths of 30-148 m. decrease an average of 0.000276°C/kg. pressure. The internal heat of friction in an ice column 200 m. high and 1 sq. m. across is equal to 534,900 gm. cal. for a vertical fall of 126 cm./yr. The heat flow is 12,000 gm. cal./yr. or about 0.022 of the heat produced by friction. A short mathematical discussion of the distribution of shear force in a viscous fluid is appended. (See also SIP U5829)

SIP U6509

Huntsman, A. G.
ARCTIC ICE ON OUR EASTERN COAST. Bull. No. 13, Biol. Board Can. 12p. incl. maps, Jan. 1930.
DLC, GB2429.H7, 1930

The principal routes taken by icebergs and field ice are mapped and their influence on the eastern coast of Canada is discussed. The icebergs retain their characteristics nearly to the point of their disappearance. Field ice is thinner, more subject to alteration, and less deeply submerged. These characteristics make field ice more readily influenced by winds which move greater amounts southward along the coast. It is recommended to block the Strait of Belle Isle to ice without interfering with the flow of water to improve navigation and develop fisheries.

SIP U6510

Johansson, Gösta
SNOW LOADING WITH A TRACTOR. (Snölastning med traktor; Text in Swedish). Svenska Vägförening. Tid. 35:168-171 incl. illus. June 1948.
DPR, Unclassed periodical

A shovel operated hydraulically is mounted on a tractor with a movable steel frame. The tractor is equipped with a dual front wheel for maximum maneuverability. The device loads a truck in 2 min. and can readily be converted for snowplowing.

SIP U6511

Liljequist, Bertil
REPORT FROM VÄGFORENINGEN'S MEETING IN STOCKHOLM APRIL 5, 1948. (Referat från Vägföreningens extra vägmöte i Stockholm den 5 April 1948; Text in Swedish). Svenska Vägförening. Tid. 35:138-144 incl. illus. graphs, May 1948.
DPR, Unclassed periodical

Sanding of icy roads and winter road maintenance equipment are discussed. Various types of glaze are described. Sand particles should be 2-9 mm. in size, clean, preferably warmed, and mixed with salt. The discharge range of a snowplow is closely related to the initial speed of discharge. Detailed studies on this problem are under way in Finland. The annual snow removal in Sweden amounts to 300,000,000 cu. m.

SIP U6512

Persson, O.
STABILITY AND BEARING CAPACITY OF AN ICE COVER. (Beständighet och bärighet hos ett istäcke; Text in Swedish). Svenska Vägförening. Tid. 35:406-417 incl. graphs, map, diagrs. Dec. 1948. 8 refs.
DPR, Unclassed periodical

Various conditions under which cracks in sea and lake ice occur are discussed. Turbulent eddies are a frequent cause of ice-cover destruction. The partial breakup of the winter road over the Jansjärv Sea is cited as an example. The bearing capacity of ice was measured and the values obtained were in good agreement with those derived from Westergaard's formula. The values ranged from 386 kg. for a 4.7-cm. ice cover to 2920 kg. for a 13.0-cm. cover. Calculated values given for the bearing capacity of an ice cover must be used cautiously in practical applications.

SIP U6513

Wolff, A.
AN EXPERIMENT TO CLASSIFY HIGHWAYS ACCORDING TO SNOW REMOVAL. (Ett försök till klassificering av vägar ur snöplogssynspunkt; Text in Swedish). Svenska Vägförening. Tid. 35:9-14 incl. illus. tables, Feb. 1948.
DPR, Unclassed periodical

An investigation was conducted in 1946 to establish a basis from which snow removal costs can be calculated. Snow removal is conducted largely through private contractors. Approximately 81% of the roads were surveyed and divided into sections appropriate for plowing speeds of 4-5.5, 5.5-7, 7-9, 9-12.5 km./hr. with trucks equipped with front and side-plows. Contracts were negotiated on this basis.

SIP U6514

Persson, O.
ICE FORMATION AND GROWTH IN OPEN WATER. (Isbildning och istilväxt på fria vattensamlingar; Text in Swedish). Svenska Vägförening. Tid. 35: 324-330 incl. table, graphs, Oct. 1948.
DPR, Unclassed periodical

A nomogram based on Devik's formula is given for determining ice growth in fresh water, utilizing elapsed time, air temperature, cloudiness and wind speed. Another nomogram indicates the effect of a snow cover on ice growth. Heat supply from the bottom of the water body can be assumed to reduce the rate of ice growth from 0.07-0.01 cm./day from Nov.-March respectively. Additional corrections for the effect of diffuse sky radiation are given.

SIP U6515

Wolff, A.
THE FUNCTION OF SNOW FENCES IN WINTER ROAD MAINTENANCE. (Snöskärmars uppgift i vinterväghållningen; Text in Swedish). Svenska Vägförening. Tid. 28:154-176 incl. illus. table, map, diagrs. July 1941. 9 refs.
DPR, Unclassed periodical

Correctly placed snow fences catch snow outside the highways through their lee-effect. This effect is analyzed in view of the studies of Finney, Irminger and Nökkentved. Various types of snow fences are described in relation to their effectiveness, construction and design. Detailed studies on snow and local wind velocities indicate the importance of planning, construction and maintenance of winter roads.

A table of data (1931-1938) from 700 stations features first and last days, duration and thickness of the snow cover in 24 Swedish regions.

SIP U6516

Ekström, Gunnar
GLAZE ON ROAD SURFACES. (Om isbark på vägbanor; Text in Swedish). Svenska Vägföreningen. Tid. 28:214-219 incl. illus. diagrs. Oct. 1941.
DPR, Unclassed periodical

Glaze on roads is caused by supercooled rain, by rain above 0°C falling on a supercooled road surface, and by fog moving rapidly over a supercooled road surface. Pavements consisting of asphalt mixtures are less subject to ice formation than other types.

SIP U6517

Wolff, A.
MODERN SWEDISH SNOW CUTTERS. (Moderna svanska vägsnöslungor; Text in Swedish). Svenska Vägföreningen. Tid. 31:51-56 incl. illus. table, March 1944.
DPR, Unclassed periodical

Three snow cutters of military design are discussed and described. The tractor-driven hydraulic type AJ-42 throws the snow 45 m. at 7.5 ton/min. The truck-driven AJ-43 has a capacity of 63.5 cu. m./min. for a snow density of 0.274 and 24.5 cm. depth with a speed of 6.2 km./hr. This type works satisfactory on highways and airfields and its motor is strong enough for snow depths above 1.1 m. Type AJ-44 is truck-driven, adapted for rural roads and awaits field tests.

SIP U6518

S[venska] J[arnvägers] Presstjänst
A NOVEL SNOW CUTTER FOR SKANE RAILROADS. (Ny snöslunga för Skåne; Text in Swedish). Svenska Vägföreningen. Tid. 31:56-59 incl. illus. March 1944.
DPR, Unclassed periodical

The steam-driven snow cutter weighs 118 tons, has a total wheel base of 14.1 m. and a length of 18.5 m. The engine develops 700 hp. The 3-m. diam. cutter wheel makes 180 r.p.m. which can be automatically adjusted to meet the snow conditions.

SIP U6519

Shenrok, A. M., M. F. TSionglinskiĭ and L. A. IAchevskiĭ
THE STUDY OF ANCHOR ICE IN 1904. (Otchet komissii po izucheniû donnogo l'da ob eià rabotakh v 1904 godu; Text in Russian). Izvestiia Vsesoûznogo Geograficheskogo Obshchestva, 41:289-396 incl. tables, map, 1905.
DLC, G23.R6, v. 41

Anchor-ice data were collected from 553 widely scattered places in Russia, 413 of which were in European Russia. The list of 50 local names for anchor ice indicates its common occurrence. Anchor ice appears first in the Perm province near mid-Oct., in the northern and northeastern provinces between Nov. 3-6, and in the western and southern provinces in late Dec. after heavy snow precipitation and rapid drops in air and water temperatures. Clear skies and rapid cooling of water were present in 69% of anchor ice occurrences.

SIP U6520

Sokolov, I. T.
ULTRASONIC INFLUENCE ON SUPERCOOLED WATER. (Vozdeĭstvie ul'trazvukov na pereokhlazhdennuû vodu; Text in Russian). Zhurnal Tekhnicheskoĭ Fiziki, 8:901-902 incl. table, diagr. 1938. 1 ref.
DLC, QC1.Z48, v. 8

Experiments were conducted showing the effect of ultrasonic emission on the crystallization of water supercooled to -6.5°C. The relationship was expressed in terms of power and not in frequency. An emission current of 8-10 w./sq. cm. produced crystals at once; 2.5 w./sq. cm. produced crystallization after 4 sec.

SIP U6521

Efimov, I. E.
CLIMATOLOGICAL DATA FOR SMOLENSK. (Klimatologicheskiĭ spravochnik po Smolensku; Text in Russian). Materialy k izucheniû estestvennykh proizvoditel'nykh sil Zapadnoĭ Oblasti, 4:3-38 incl. tables, 1936. 26 refs.
DLC, QC806.R8, v. 4

Data from 1836-1930 of Smolensk and areas of the western provinces are tabulated. The soil usually remains frozen from Oct.-May with maximum frost penetration occurring in March. The deepest frost penetration was 131 cm. at Novozybkov, 129 cm. at the Bryansk Experimental Forest, and 118 cm. at Batishchevo. The Smolensk region usually remained snow-covered from Oct.-April reaching a maximum depth of 75 cm. in April. The mean density of the snow cover during the winters of 1928-1930 varied from 0.17-0.30.

SIP U6522

Ermakov, A. V.
SOME FORMS OF SOD DEFORMATION. (Nekotorye vidy deformatsii derniny; Text in Russian). Priroda, 42:114 incl. diagrs. 1953.
DLC, Q4.P8, v. 42

Sod deformation into rolls, 6 10 m. long and 0.7-0.9 m. in diam., was observed in one region of Siberia in Aug. 1952. The affected area, 300 m. long and 40-50 m. wide, was on a highly saturated 15°-18° slope underlaid with permafrost at a depth of 0.25 cm. These formations were probably produced by thaw action in the upper layers.

SIP U6523

World Meteorological Organization
THE INTERNATIONAL ICE NOMENCLATURE. 8p. July 1952.
DWB, 551.311 W927i

A nomenclature of about 75 terms and definitions of ice found at sea and formed on water or on land is presented. The terms are grouped under headings which serve as a guide to terms describing kindred forms of ice. The definitions of the ice terms are arranged in alphabetical order.

SIP U6524

Barnes, Howard T.
ICEBERGS AND THEIR LOCATION IN NAVIGATION. p.717-740 incl. illus. tables, graphs, diagrs. appendices 1, 2, [1913]. (In: Annual Rept. of the Board of Regents of The Smithsonian Inst. ... for the Year ended June 30, 1912). 1 ref.
DLC, Q11.S66, 1913

The icebergs encountered in the North Atlantic come mainly from western Greenland. The average iceberg is 300-500 yd. long, 200-250 ft. high, and is submerged to depths 7-8 times its height. The influence of icebergs on the temperature of the sea is discussed and a micro-thermogram of the iceberg effect is presented. Letters to Nature on the rise of water temperature associated with the melting of icebergs are appended.

SIP U6525

Puget, and Neumann
HEATING OF POINTS DURING SNOWY WEATHER. Monthly Bull. Intern. Ry. Congress Assoc. (Eng. ed.) 25:365-375 incl. illus. tables, graphs, diagrs. June 1948. 3 refs.
DLC, TF1.I622, v. 25

The efficiency of electric and steam heating of frog points to prevent their blocking by snow is discussed. The steam heating device produces greater heating power, but possesses serious disadvantages such as freezing of the condensed water, oxidation of the steam tubes, complicated installation, and the ease of breakdown of the steam source. Electric heating by resistance or induction produces a similar effect and raises the temperature of the rail 9°-10°C above that of the surroundings in 6 hr., at which temperature it is maintained.

SIP U6526

Scott, Irving D.
ICE-PUSH ON LAKE SHORES. Papers Mich. Acad. Sci. 7:107-123 incl. illus. diagrs. 1927. 12 refs.
DLC, Q11.M56, v. 7

Ice push on lake shores is due to expansion and ice jam, both processes forming similar features. The mechanics of each process is described and their relative importance discussed. Expansion occurs on small lakes when a complete, thick ice cover forms with little or no snow cover under conditions of large and relatively rapid changes in temperature. Ice jams occur on large lakes in regions of heavy snowfall.

SIP U6527

Germany. Reichsamt für Wetterdienst (Luftwaffe). Klimainstitut Nikolajew
WATER AND ICE CONDITIONS OF THE DNEPR. (Wasser- und Eisverhältnisse des Dnjepr; Text in German). 1p. graphs, [1943]. (typed ms.)
DWB, File No. 2734

The maximum water levels occur regularly during the second half of April or beginning May. The beginning of a homogeneous ice cover and breakup varies widely depending upon the mildness or severity of the winter. Long-period means (1876-1930) of the beginning dates and of breakup are tabulated for various stations. Ice cover duration and debacle of the Dnepr at Kherson are tabulated for 1924-1942. The average ice thickness along the banks near Kherson is 20-25 cm.

SIP U6528

Schuh
ICE CONDITIONS OF THE DNEPR. (Eisverhältnisse des Dnjepr; Text in German). Armeeoberkommando 17/O. Qu. W. Geol. St. (14), Az. 39 Geol. 10/g Nr. 128/41, 4p. incl. table, graph, Sept. 6, 1943. (typed ms.)
DWB, File No. 2734

Average dates of ice-cover breakup and beginning of ice-cover formation, number of navigation days, and mean dates of ice-cover breakup and formation (1876-1930) are tabulated for various stations. Anchor-ice formations at various locations, and locations of sufficient ice-cover thickness to permit crossing by vehicles are indicated. The ice conditions of the left and right tributaries of the Dnepr are discussed.

SIP U6529

ICING, FLOOD, AND THAW WEATHER DATES OF THE DNEPR IN THE AREA OF THE SOUTHERN ARMY GROUP. (Vereisungs-Hochwasser- u. Verschlammungstermine f.d. Dnjepr im Bereiche d. H. Gr. Süd; Text in German). Suppl. to W. Geol. St. 16, Nr. 316/43, graph, [1943].
DWB, File No. 2734

The early, average, and late range of Dnepr freezing and thawing, fall and spring ground thaw and drying periods, and flood conditions are graphed. Trafficability of roads and of the Dnepr River are indicated.

SIP U6530

Simon
THE ICE COVER OF THE DNEPER, THICKNESS AND BEARING CAPACITY. (Die Eisdecke des Dnjepr, Stärke und Tragfähigkeit; Text in German). Wehrgeologenstelle 16 bei H. Gr. Süd, Suppl. 3 to Gen. d. Pi./Obkdo. H. Gr. Süd, Az.: 39 Geol. 10g, Nr. 330/43, graphs, Nov. 1, 1943.
DWB, File No. 2734

The ice thicknesses and bearing capacities of the Dnepr River for a warm (1938-39), average (1932-33), and severe winter (1927-28) are graphed individually for 9 stations. The bearing capacities ranged from 3.5-60 tons for thicknesses of 20-60 cm. and intervals between loads of 20-65 m. respectively.

SIP U6531

Simon
ICING OF THE LOWER AND CENTRAL DNEPR. (Vereisung des unteren und mittleren Dnjepr; Text in German). Wehrgeologenstelle 16 b. H. Gr. Süd, Suppl. 2 to Gen. d. Pi./Obkdo. H. Gr. Süd, Az.: 39. Geol. 10g, Nr. 330/43, map, Nov. 1, 1943.
DWB, File No. 2743

Ice-cover formation and breakup dates based on long-period means are indicated. Maximum observed ice thickness and month of maximum ice thickness at various locations, and favorable ice crossings are shown.

SIP U6532

ICE CONDITIONS IN THE UPPER AREA OF THE DNIESTER RIVER. (Eisverhältnisse im oberen Gebiete des Dnjestrflusses; Text in German). Excerpt from paper by W. Janowski of 1932, 8p., table, graphs.
DWB, File No. 2734

Two hydrological periods are differentiated: the ice period and the stationary ice period. The ice period encompasses the time from the appearance of the first ice to the final disappearance, and the stationary ice period is the range of complete icing of the river surface to the final dissolution. The average duration of the ice period for the Dniester River (Poland) is 99 days and that of the stationary ice period is 62 days according to observations from 1909-1930. Average daily air temperatures for each day of the months Oct.-April are tabulated and plotted against the icing period of the Dniester.

SIP U6533

THE ICE CONDITIONS IN THE LOWER COURSE OF THE DONETS, DON AND VOLGA RIVERS. (Die Eisverhältnisse von Donez, Don und Wolga im Unterlauf; Text in German). Wehrgeologenstelle 16 bei H. Gr. Don, Az. 39 Geol. 10g, Nr. 230/42, 1p. table, Dec. 12, 1942. (typed ms.)
DWB, File No. 2734

Earliest, latest, and average dates of icing and breakup, and current speeds are tabulated for various stations.

SIP U6534

Hahn
THE ICE COVER OF THE WATERS IN THE THEATER OF OPERATIONS. (Die Eisdecke der Gewässer im Operationsraum; Text in German). Armeeoberkommando 9, Wehrgeologenstelle 13, Br.-B. Nr. 526/41 geh., 2p, tables, Dec. 2, 1941. (typed ms.)
DWB, File No. 2734

Freezing dates of the upper course of the Volga River for 1931-1939, the average dates of a 58-yr. observation series, and ice-cover thicknesses of the winter 1936-37 are tabulated for various stations. The most frequent freezing dates occur between Nov. 27-Dec. 8, and the maximum ice-cover thickness measured was 82 cm.

SIP U6535

Germany. Reichsamt für Wetterdienst (Luftwaffe). Klimainstitut Charkow
SHORT SUMMARY OF ICE CONDITIONS ON THE DON, DONETS, AND VOLGA. (Kurze Übersicht über die Eisverh. auf Don, Donez u. Wolga; Text in German). 1p. tables, [1942]. (typed ms.)
DWB, File No. 2734

Early, late, and average dates of freezing and of a homogeneous ice cover, maximum, minimum, and average number of ice-free days for various stations are tabulated and analyzed.

SIP U6536

Siegfried
ICE CONDITIONS ON THE KUBAN BRIDGE HEAD. (Eisverhältnisse am Kuban-Brückenkopf; Text in German). Armeeoberkommando 17, Wehrgeologenstelle 14, Az. 39 Geol. 10g, Nr. 860/43, Gutachten Nr. 133, 8p. incl. table, maps, Aug. 19, 1943.
DWB, File No. 2734

The average number of days with ice for various ports along the Black Sea and the Kuban River are tabulated and mapped. Maps indicating the extent of the ice cover and the type of ice on Nov. 25, Dec. 15, Jan. 15, Feb. 15, March 15, and April 15 during mild, average, and severe winters are presented.

SIP U6537

SUMMARY OF ICE CONDITIONS IN PINSK ON THE PINA RIVER FOR THE PERIOD FROM 1925 TO 1944. (Übersicht der Eisverhältnisse in Pinsk auf der Pina für die Zeit von 1925 bis 1944; Text in German). graph, [1944].
DWB, File No. 2734

The period beginning with a homogeneous ice cover

and ending with breakup is graphed for each year from 1925-1944. The water levels at the time of ice-cover formation and breakup are indicated.

SIP U6538

Kalitin, N. N.
METHODS FOR MEASURING THE ALBEDO OF THE EARTH'S SURFACE UNDER NATURAL CONDITIONS. (Metodika izmereniĭa albedo zemnoĭ poverkhnosti v estestvennykh usloviĭakh; Text in Russian with French summary). Izvestiĭa Glavnoĭ Geofizicheskoĭ Observatorii, No. 3-4:26-31 incl. illus. tables, graphs, diagr. 1931. 6 refs.
DLC, QC801.I467, 1931

A photoelectric method for albedo measurements for both short- and long-wave radiation is described. Infrared and ultraviolet radiation recorded was limited by the sensitivity of the infrared and regular plates. A quartz spectrograph was adapted for measuring both incident and reflected radiation. Albedo values for snow cover were 85% and 87% for total and short-wave radiation. Values for lime, sand, grass and clay are tabulated.

SIP U6539

Kalitin, N. N.
ALBEDO OF THE EARTH'S SURFACE. (Albedo zemnoĭ poverkhnosti; Text in Russian). Meteorologicheskiĭ Vestnik, 39:223-232 incl. illus. tables, graph, 1929. 3 refs.
DLC, QC851.M5, v. 39

The albedo of the earth's surface (snow, grass and soil cover) was measured with an Ångström pyranometer and a Zeiss galvanometer. The maximum average value of snow-cover albedo recorded at Slutsk (near Leningrad) was 87.0% at 7 Ci cloudiness on March 11. Tables indicate the average daily values of snow-cover albedo for Feb.-May varying from 83.4-17.6. The albedo of the earth's surface varies widely depending on cloudiness, type of precipitation, and soil.

SIP U6540

Mügge, O.
THE SYMMETRY OF ICE CRYSTALS. (Über die Symmetrie der Eiskristalle; Text in German). Zentr. Mineral. Geol. [42]:137-141, 1918. 17 refs.
DLC, QE1.C3, 1918

The results of various investigators are analyzed to support the hypothesis that snow and ice crystals are trigonal. Apparent hexagonal forms are attributed to twin formations. An experiment was conducted to test the polarity of ice crystals by melting pond-ice crystal plates in petroleum. No significant differences were noted in the shrinking of the diam. of the 2 basal surfaces, which was parallel to the optic axis. It is concluded that this result is insufficient evidence to disclaim hemimorphism.

SIP U6541

Stecher, E.
HEMIMORPHOUS ICE CRYSTALS. (Hemimorphe Eiskristalle; Text in German). Zentr. Mineral. Geol. [38], No. 15:456, Aug. 1, 1914.
DLC, QE1.C3, 1914

The observation of graupel grains consisting predominantly of hexagonal pyramids at an elevation of 550 m. during a hailstorm is reported. The pyramidal edge was 5-6 mm. long and all edges were slightly rounded.

SIP U6542

Kalb, Georg
CRYSTAL FORM AND GROWTH OF ICE. (Kristalltracht und Aufwachsung des Eises; Text in German). Zentr. Mineral. Geol. [45], No. 5:129-134 incl. table, March 1, 1921. 10 refs.
DLC, QE1.C3, 1921

The crystal form of snow is chiefly dependent on the formation temperature. Ice plates are formed at temperatures near 0°C, and prismatic forms at decreasing temperatures. Ice plates grow predominantly from the edge of the plate, and prisms from one end of the main axis in accordance with the law of crystal growth.

SIP U6543

Stecher, E.
"HEMIMORPHOUS" ICE CRYSTALS. ("Hemimorphe" Eiskristalle; Text in German). Zentr. Mineral. Geol. [45], No. 10:289, May 15, 1921.
DLC, QE1.C3, 1921

A previously reported observation of hexagonal ice pyramids during a hailstorm is amended to include the fact that all the pyramids were hollow. The observation confirms Mügge's finding that this phenomena is not an indication of hemimorphism. (See also SIP U6540 and U6541)

SIP U6544

Mirotvortsev, K. N.
CLIMATE OF EASTERN SIBERIA. (Klimat Vostochnosibirskogo kraĭa; Text in Russian). Moscow, Irkutsk, 1934, [217]p. incl. tables, graphs, maps. 61 refs.
DLC, QC990.R8M5, 1934

The climatic conditions between the Kara Sea and the area between 49°N. lat. and 80°-125°E. long. are summarized based on long-period observations at 136 stations. Continental climate, low winter temperatures, scant snow cover and permafrost are characteristics of this area of over 3.5 million sq. km. The annual number of days with frost varied from 203 days (Krasnoyarsk) to 260 days (Dudinka), increasing in mountainous regions. Permafrost occurs north of 56°-60°N. lat. and in

many southeastern regions. Lake and river ice became 150-210 cm. thick in regions with little snow cover.

SIP U6545

Tyrrell, J. B.
ICE ON CANADIAN LAKES. Trans. Can. Inst. 9: 13-21, illus. Aug. 1910. 1 ref.
DLC, AS42.C21, v. 9

Lake ice increases in thickness from the top in regions where heavy snowfall submerges young lake ice and the overflowing water freezes. Lake ice increases in thickness from the bottom in regions of light snowfall. Lake ice contracts with decrease in temperature producing cracks in which water freezes. Lake ice expands with increase in temperature and forms ridges as old ice crushes the new ice. Thawing in spring occurs along the shore line. Wind action thrusts the ice floes against the shore, and sand and stones are moved beyond the beach to form ramparts.

SIP U6546

El'ster, A. IU.
CLIMATIC CONDITIONS OF THE ONEGA-SVIR BASIN AND THEIR INFLUENCE ON THE RUN-OFF OF THE SVIR RIVER. (Klimaticheskie usloviia Onezhsko-Svirskogo basseina i ikh vliianie na stok r. Sviri; Text in Russian). Leningrad, Svir'stroi, 1935, 132p. incl. tables, map, graphs, (appendix).
DLC, QC990.R8F4, 1935

Hydrometeorological observations of 73 places from 1881-1930 are tabulated and discussed. Snow-cover depths of over 500 places are given for 10-day periods. The Svir River was generally ice-covered from the end of Nov.-April, or a maximum period of 170-185 days to a minimum of 84-119 days. Lake Onega was ice-covered on the average from Dec. 13-May 15. The snow cover attained a maximum in March, when the lowest, average and highest maximums were 29 cm., 51 cm. and 72 cm. Graphs indicate that variations in run-off depend on climatic factors, particularly on snow-cover depth and temperature.

SIP U6547

Hobbs, William H.
REQUISITE CONDITIONS FOR THE FORMATION OF ICE RAMPARTS. J. Geol. 19:157-160 incl. map, Feb.-March 1911. 2 refs.
DLC, QE1.J8, v. 19

The initial ice cover on lakes forms at moderately cold temperatures and grows slowly from the under surface. Sudden cold air temperatures contract the ice cover, fissures develop and the water in them freezes to complete an ice cover at a lower temperature. A sudden rise in temperature enlarges the ice sheet and exerts a push on the shore. Snow on the ice cover, a lake less than 0.5 or more than 1.5 mi. across, and slow temperature changes destroy the girding competency of the ice sheet and prevent the formation of ice ramparts.

SIP U6548

Lavrova, M. A.
NOTES ON THE VALLEY GLACIERS OF THE RUSANOV VALLEY AND KRESTOVAYA FIORD IN NOVAYA ZEMLYA. (Zametki o dolinnykh lednikakh doliny Rusanova i guby Krestovoĭ na Novoĭ Zemle; Text in Russian with English summary). Trudy Geologicheskogo Instituta, 1:95-132 incl. illus. graphs, maps, diagrs. 1932. 7 refs.
DLC, QE1.A335, v. 1

Five glaciers of the valley type were observed in the summer of 1925 and compared with the records of 1921. The snow line lowered from 500 m. to 200-250 m. Glacier melting proceeded in direct proportion to air temperature becoming most intensive on clear, warm days due to increased heat radiation from dark rocks. Large deposits of terminal and red moraines and the development of alluvial cones indicate that the glaciers in the region are almost stationary.

SIP U6549

Glavnaia Geofizicheskaia Observatoriia
INSTRUCTIONS FOR MEASUREMENT OF THE SNOW COVER DEPTH. (Spetsial'naia instruktsiia dlia izmereniia snegovogo pokrova v otdel'nykh punktakh i po liniiam; Text in Russian). Leningrad, 1925, 2nd ed. 31p. incl. tables, diagrs.
DLC, QC929.G4, 1925

Snow cover depths are determined through stationary measurements and field measurements along a line. Stationary measurements are made in open areas not subjected to winds. Field measurements are made along a triangle with a 3-km. perimeter in an area representative of the region. Stationary measurements are made daily; field measurements, every 10 days. Snow characteristics for inclusion in the reports are listed. Samples of records and telegraphic reports to the Central Observatory are given.

SIP U6550

Knoblock, Frederick D.
THE CONQUEST OF SNOW. Mich. Tech. 39, No. 2:10-11, 23-24 incl. illus. Jan. 1926.
DLC, TA1.M63, v. 39

The Snow-Motor operates successfully on fresh snow 5 ft. deep, in drifts, over ice, protruding fences and bare ground. The Snow-Motor consists of a running gear mounted on a Fordson tractor in which the wheels and axles are replaced by a drum assembly. The drums consist of a straight portion 6 ft. long, 30 in. in diam. terminating at each end in conical sections 8 in. long. Six triangular skates are mounted on each drum forming a thread and revolving the drums in opposite directions.

SIP U6551

Chudakov, P. A.
SOME RESULTS OF DAILY ILLUMINATION MEASUREMENTS. (Nekotorye dannye po izmereniû dnevnoĭ osveshchennosti; Text in Russian). Zhurnal Tekhnicheskoĭ Fiziki, 5:174-175 incl. tables, graph, 1935.
DLC, QC1.Z48, v. 5

Illumination was measured at Mytishchi (near Moscow) from April-Dec. 1933. Illumination in direct sunlight reached a maximum of 6.1 phot in July, and decreased toward autumn. The appearance of a snow cover increased the values of illumination again. The mean illumination in direct sunlight was 4.3 phot in Aug., and 5.05 phot in Nov. with a snow cover. Illumination in diffuse light was 2.0 phot in Aug. and 3.75 phot in Nov.

SIP U6552

Gladtsin, I. N.
GEOMORPHOLOGICAL OUTLINE OF TRANSBAYKAL. (Geomorfologicheskiĭ ocherk Zabaĭkal'ûa; Text in Russian with English summary). Trudy Instituta Fizicheskoĭ Geografii, 29:117-195 incl. illus. maps, 1938. 145 refs.
DLC, GB236.A4, v. 29

Permafrost is evident in the Transbaykal region through relief, hillocks, ground water in unusual places, and mounds and small mud volcanoes on the banks of lakes. Mud mounds (puchi) with underground icings up to 4 m. thick and 160 m. wide are often observed on the slopes of valleys. They contain ice blocks (3 m. thick) even in summer which melt into streams flowing through the cracks of the mounds. Permafrost is indicated by the presence of typical goletà or bald peaks with flattened tops.

SIP U6553

Germany. Reichsamt für Wetterdienst (Luftwaffe)
SNOW MELT, GROUND THAW, AND GROUND DRYING IN THE UKRAINE. (Schneeschmelze, Bodenaufweichung und Bodenabtrocknung in der Ukraine; Text in German). Az. 1. D. 42 d. 4323/64, 2p. tables, [1943]. (typed ms.)
DWB, File No. 2738

Dates of the first snow melt, ground thaw, and ground drying for 1936-1940, and mean dates of snow-cover disappearance from 1931-1940 for various stations in the Ukraine are tabulated.

SIP U6554

Wall, E. and Ed. Huss
SEVERAL UNUSUAL AND LITTLE KNOWN CRYSTALLIZATION PHENOMENA OF ICE. (Einige merkwürdige und wenig bekannte Kristallisations-Erscheinungen des Eises; Text in German). Z. angew. Meteorologie, 57:84-90 incl. illus. March 1940.
DWB, P Z48a, v. 57

Ice-crystal druses are formed in hollow spaces between an ice cover and the ground or another ice cover, due to sublimation. Hexagonal-plate type crystals usually predominate in druses. Other forms such as prismatic columns, prisms with hexagonal end plates, hexagonal and rectangular cup-shaped crystals, and spirals are shown and explained. The formation of Haareis (ice filaments) on protected, open ground or tree branches on the ground at temperatures slightly below 0°C when the ground is well saturated, is attributed to capillary internal pressure and the plasticity of ice near 0°C. Each filament represents a crystal with uniform internal orientation.

SIP U6555

Kassner, C.
SNOWFALL IN A BALLROOM. (Schneefall im Ballsaal; Text in German). Z. angew. Meteorologie, 57:93-95, March 1940.
DWB, P Z48a, v. 57

Several cases are cited in which snow particles or fine ice spicules formed within a heated room when cold air from the outside was suddenly permitted to enter. Prerequisites for such formations are a large temperature differential between inside and outside temperature, and a high inside humidity. A. Wegener frequently observed the formation of a dense fog upon opening a door in Greenland, which, he asserts, consists of supercooled liquid water droplets even at temperatures as low as -45°C.

SIP U6556

Linke, F.
ON THE FORMATION OF PENITENT SNOW. (Über die Entstehung des Büsserschnees; Text in German). Z. angew. Meteorologie, 57:182-184, June 1940.
DWB, P Z48a, v. 57

Penitent snow is a phenomenon of tropical and subtropical high mountains. Prerequisites for penitent snow formations include great solar radiation intensity, low humidity, and air temperatures below 0°C. The inclination of the snow columns usually corresponds to the direction of solar radiation at about 3-4 p.m., when the snow temperature exceeds 0°C. The thaw process is not regular over the snow surface but depends upon the density and purity of the snow.

SIP U6557

Mrose, Helmut
THE DEPENDENCY OF THE SLIPPERINESS OF SNOW ON ITS CRYSTAL STRUCTURE. (Die Abhängigkeit der Gleitfähigkeit des Schnees von seiner Kristallstruktur; Text in German). Z. angew. Meteorologie, 57:190-192, June 1940.
DWB, P Z48a, v. 57

The ideal snow for skiing consists of undisturbed new snow in which the points of the snowflake plumes

have evaporated and sublimated on colder points. A large temperature gradient within the snow cover is necessary for the sublimation process. Snow in such sublimated state does not ball even at 0°C. The slipperiness of a snow cover increases with the size and number of smooth crystal surfaces. Very wet snow is an excellent sliding surface as long as the ski is dry. Blown new snow or drift snow is detrimental to skiing due to its great adhesive quality.

SIP U6558

Mrose, H.
CHEMICAL EXAMINATION OF RIME MELTWATER IN THURINGIA. (Chemische Untersuchung von Rauhreifschmelzwasser in Thüringen; Text in German). Z. angew. Meteorologie, 57:241-254 incl. table, Aug. 1940. 12 refs.
DWB, P Z48a, v. 57

Rime deposits collected 4-8 km. from Jena (Germany) from trees and bushes were chemically analyzed to determine the nature of the condensation nuclei, which chiefly originate from nearby industrial wastes. The determination of the filtrate, SO_4, Cl, NH_3, NO_3, and pH-value is described. Iron content was determined by means of an ore analysis. The results show an excess of condensation nuclei from combustion products.

SIP U6559

Götz, Paul
SAHARA SAND IN RIME. (Saharasand im Rauhreif; Text in German). Z. angew. Meteorologie, 57:360-361, Nov. 1940. 1 ref.
DWB, P Z48a, v. 57

Ochre-colored rime deposits were observed on the Jungfraujoch on July 15, 1940. Red bands and ripples of drifted sand appeared at regular intervals over the entire Jungfrau firn.

SIP U6560

Rinne, F.
THE CRYSTAL SYSTEM AND AXIAL RATIO OF ICE. (Das Kristallsystem und das Achsen verhältnis des Eises; Text in German). Ber. Verhandl. sächs. Akad. Wiss. Leipzig, Math.-phys. Klasse, 69:57-62 incl. table, diagrs. 1917. 2 refs.
DLC, AS182.S214, v. 69

A plate of ice, 0.7 cm. thick, and formed on a freezing water surface was optically examined and Laue diffraction photographs were made. Liquid air was dropped into the camera to prevent melting of the ice. It is concluded that ice crystallizes as dihexagonal-bipyramidal on the basis of the diffraction pattern and an ice-crystal study made by Nordenskiöld in 1861. The axial ratio a : c is found to be either 1:1.678 or 1:1.575 depending on the distance between the photographic plate and the reflective surface of the crystal. The average value is in good agreement with that obtained by Nordenskiöld (1:1.617).

SIP U6561

Gross, R.
THE LAUE PHOTOGRAM OF ICE. (Das Lauephotogramm des Eises; Text in German). Zentr. Mineral. Geol. No. 13-14:201-207 incl. tables, graphs, diagrs. July 1919. 6 refs.
DLC, QE1.C3, 1919

Laue photographs of ice previously reported by Rinne are evaluated. Three diffraction patterns of different ice crystals all showed full hexagonal symmetry. A uniform hexagonal structure is found which explains the Laue reflections, in contrast to Mügge's assumption that the hexagonal symmetry is a deception of twin formation and that the true crystal symmetry is only rhombohedral. (See also SIP U6540 and U6560)

SIP U6562

Vincent, J. H.
THE DENSITY AND COEFFICIENT OF CUBICAL EXPANSION OF ICE. Phil. Trans. Roy. Soc. (London), 198:463-481 incl. tables, graphs, diagrs. May 1902.
DLC, Q41.L8, v. 198

The apparatus consists of an umbrella-shaped vessel of steel immersed in Hg and attached to a scale pan. Air-free water is caught under the umbrella. The buoyancy of the umbrella, water at 0°C and ice at temperatures varying from -10.02° to -0.37°C were measured by equilibration. The densities were determined from 10 measurements of 4 samples of ice, extrapolated to 0°C and a weighted mean value derived. The ice density at 0°C is 0.9160; the cubical expansion is 0.000152. The work of previous observers is briefly summarized.

SIP U6563

Anokhin, A. I.
SNOWPLOWS AND THE THEORY OF THEIR OPERATION. (Snegoochistiteli i teoriîa ikh raboty; Text in Russian). p.356-370 incl. tables, diagrs. (In: Dorozhnye mashiny, by A. I. Anokhin and others, Moscow, Dorizdat, 1950). 4 refs.
DLC, TE223.A62, 1950

The physical and mechanical properties of snow are reviewed. Internal and external friction coefficients of snow, and resistance coefficients of snow to cutting at various temperatures are tabulated for snow densities of 0.1-0.55. Principles of snow removal operations with one-way, V-shaped and rotary plows are discussed. Rotary plows are used at speeds of 0.5-1.5 km./hr. for snow depths of 1-1.2 m. and 0.4-0.5 density. Other types of plows are operated at higher speeds for removing snow of 0.5-m. thickness and 0.25-0.5 density.

SIP U6564

Val'man, V. N.
WINTER REGIME OF THE SVIR RIVER. (Zimniĭ rezhim r. Sviri; Text in Russian). Trudy Nauchno-Issledovatel'skogo Instituta Gidrotekhniki, Sbornik po Ledotekhnike, 1:74-96 incl. tables, graphs, diagrs. 1933. 1 ref.
DLC, TC1.L43, v. 1

The ice conditions of the Svir River in relation to the construction of the Svir hydroelectric station were investigated during 1928-1930. The frequent freezing and thawing periods of autumn lead to intensive supercooling of water and the formation of anchor ice which reduces the water supply of the hydroelectric station. The preventive measures used for ice jams were found adequate to reduce anchor ice formations.

SIP U6565

Kolmogorov, R. I.
ICE REGIME IN IRTYSH RIVER FROM OBSERVATIONS IN 1920-21. (Ledovyĭ rezhim na r. Irtyshe po nablīudeniĭam v 1920-21 g.; Text in Russian). Trudy Nauchno-Issledovatel'skogo Instituta Gidrotekhniki, Sbornik po Ledotekhnike, 1:165-174 incl. diagrs. 1933. 1 ref.
DLC, TC1.L43, v. 1

The physical characteristics of an ice cover in relation to shipping and hydroelectrical development are discussed. Ice crystals appeared in the Irtysh River near Omsk from mid-Oct. to mid-Nov. with air temperatures near -3° to -5°C. The crystals freeze together to form slabs of ice, 1 cm. thick and 15 x 20 cm. to 30 x 50 cm. in area. A solid ice sheet forms within 1-1.5 days if air temperatures remain below the f.p. The ice cover formed in autumn from separate ice crystals has physical properties differing from those of winter ice. The autumn ice is denser and possesses higher viscosity and sound conductivity.

SIP U6566

Weinberg, Boris
THE CRYSTALLIZATION OF SUPERCOOLED WATER. (Die Kristallisation des unterkühlten Wassers; Text in German). Physik. Z. 9:645-646 incl. illus. Oct. 1, 1908.
DLC, QC1.P75, v. 9

A piece of ice in a tube was lowered into supercooled water to initiate crystallization. A hexagonal star similar to snow crystals formed at the tip of the tube. The branches and speed of crystallization increased with decreasing temperature of the water, and the surface of the crystal grew in the direction of the tube end. A simple method for developing such artificial snow crystals is given. Individual crystals, 8-12 cm. wide, were obtained at water temperatures of -2°C.

SIP U6567

St. John, Ancel
THE CRYSTAL STRUCTURE OF ICE. Proc. Natl. Acad. Sci. U. S. 4:193-197 incl. tables, July 1918. 2 refs.
DLC, Q11.N26, v. 4

X-ray photographs were made of commercial artificial ice, thin ice layers of frozen tap water, and ice frozen out of a weak salt solution. The spectrometer system was enclosed and the chamber kept cool by cans of ice and salt. The ice crystals from the weak salt solution were least deformed and yielded the best interferences. The investigation shows that ice is properly assigned to the hexagonal system, that it consists of 4 interpenetrating triangular lattices, and that the fundamental spacings are $a = 4.74 \times 10^{-8}$ cm.; $h = 6.65 \times 10^{-8}$ cm, $d_{11\bar{2}0} = 3.79 \times 10^{-8}$ cm.; $d_{10\bar{1}0} = 2.37 \times 10^{-8}$ cm.; $d_{0001} = 3.32 \times 10^{-8}$ cm.

SIP U6568

Tamura, S. Tetsu
AN ACCOUNT OF RECENT METEOROLOGICAL AND GEO-PHYSICAL RESEARCHES IN JAPAN. Monthly Weather Rev. (U. S.), 33:302-305 incl. tables, July 1905.
DLC, QC983.A2, v. 33

Scientific papers on the annual variation of sea-level height, the thermal conductivity of snow, and diurnal changes in the level of artesian wells in Japan are reviewed. Temperatures in accumulated snow freely exposed to direct sunshine were made hourly at depths of 10, 20, and 30 cm. in western Hokkaido from Feb. 5-17, 1904. Mean temperatures of -4.01°, -2.29°, and -1.77° [C] were obtained at depths of 10, 20, and 30 cm. respectively. Density values of 0.13, 0.24, 0.29, and 0.35 were observed for snow at depths of 5, 25, 34, and 45 [cm.] respectively. An equation is derived which relates observed density to depth. The conductivity of snow for layers at different depths is calculated using 0.508 as the specific heat of snow. The values are equal to mean values obtained by using Abel's and Janssen's formulas.

SIP U6569

Barnes, H. T.
THE ORIENTATION OF CRYSTALS OF ICE IN A FLUX OF HEAT. Nature, 83:276, May 5, 1910. (Letters to the editor)
DLC, Q1.N2, v. 83

The formation of an ice mantle in a large Bunsen ice calorimeter cooled with solid CO_2 was observed. Long needles and thin plates of ice oriented along the lines of the flow of heat grew from the solid mantle. The crystals near the top of the mantle were directed at an angle upwards, those at the base were normal to the mantle surface, and the crystals between these 2 positions grew at a corresponding inclination to the mantle surface. The path of best conductivity in the ice crystal appears to be along the principal axes.

SIP U6570

Usachev, P. I.
BIOLOGICAL INDICATORS OF THE ORIGIN OF ICE FLOES IN THE KARA AND LAPTEV SEAS AND THE STRAITS OF FRANZ JOSEPH ARCHIPELAGO. (Biologicheskie pokazateli proiskhozhdeniâ l'dov v Karskom more, more Laptevykh i v prolivakh arkhipelaga Zemli Franſsa-Iosifa; Text in Russian with English summary). Trudy Instituta Oceanologii, 1:113-150 incl. tables, map, diagr. 1946. 40 refs.
DLC, GC1.A4, v. 1

Accumulations of fauna and flora were observed on ice floes and in polar seas and their influence on ice melting is reviewed. The occlusions of 23 various ice floes were analyzed in 1936-37 according to the biological contents in their upper and lower layers. Drift ice composed of sea, fresh water or mixed ice can be differentiated through algae analysis. The results of the biological analyses and the origin of the ice are tabulated.

SIP U6571

Vlodavetš, V. I.
NOTE ON THE MINERAL SEDIMENT BLOWN ON THE ICE. (Zametka o naveſànnom mineral'nom osadke vo l'dakh; Text in Russian with English summary). Trudy Arkticheskogo Instituta (Leningrad), 33:79-85 incl. tables, graphs, 1936. 4 refs.
DLC, G600.L4, v. 33

Brown-black ice containing organic and inorganic sediments were observed in the Laptev and Chukchee seas in 1932. Tests indicated that the sediment contained 87% Al_2O_3 and SiO_2 particles, 0.1-0.001 mm. in diam., similar to Chinese loess. The sediment was apparently wind-borne.

SIP U6572

Högbom, Bertil
THE GEOLOGICAL SIGNIFICANCE OF FROST. (Über die Geologische Bedeutung des Frostes; Text in German). Uppsala, Almqvist & Wiksells Boktryckeri-A.-B., 1914. 132p. incl. illus. tables, diagrs. 140 refs. (Inaugural dissertation)
DLC, QC929.H6H6, 1914

Observations on frost effects in soils made principally in Spitsbergen are analyzed. Permafrost, regelation, frost fissures, polygonal soils, and solifluction are discussed. The significance of frost weathering on terrain features and the various polygonal and solifluction phenomena are individually treated.

SIP U6573

ANNUAL WEATHER COURSE, WATER LEVELS AND TRAFFICABILITY IN THE PRIPYAT AREA. (Jährlicher Witterungsablauf, Wasserstände u. Wegsamkeit im Pripetgebiet; Text in German). Wehrgeologenstelle 37, graphs, April 26, 1944.
DWB, File No. 2735

Monthly mean precipitation, mean daily water levels, ice-cover duration and thickness, mean monthly temperatures, and monthly trafficability conditions are graphically presented.

SIP U6574

WINTER CALENDAR FOR GROUND AND WATER IN THE UPPER VISTULA AREA. (Winterkalender für Boden und Gewässer im Raum der oberen Weichsel; Text in German). Wehrgeologenstelle 16/Nr. 595/44, 1p. 1944. (Graphs)
DWB, File No. 2735

Periods of icing and flooding of the Vistula, mud periods in the plains (Krakow) and the mountains (Zakopane), and snow cover depths and dates of mean beginning, maximum, and end for the hill country, Vistula area, Carpathian rim, and the Carpathians are plotted. Conclusions are drawn concerning trafficability on the Vistula and on roads from Oct.-May.

SIP U6575

WINTER IN THE GENERAL GOVERNMENT AREA. GROUND CONDITIONS. (Der Winter im Generalgouvernement. Erdbodenzustand; Text in German). Wehrgeologenstelle 16/Obkdo. H. Gr. A/Gen. d. Pi. Nr. 660/44, 1p. incl. map, Dec. 4, 1944. (graphs)
DWB, File No. 2735

Frost, snow cover, and mud periods from Dec.-April are plotted for Warsaw, Deblin-Irena, Tschenstochau, Kielce, Krakow, Tarnow, Zakopane, Krynica, and Krosno (Poland) on the basis of data for 4 yr.

SIP U6576

Benner, J.
DRAWING OF MAPS OF GROUND THAWING DURING SPRING IN THE FIELD AIR FORCE ADMINISTRATIVE AREA COMMAND. (Ausarbeitung von Karten der Bodenaufweichung im Frühjahr im Bereich des Feldluftgaukommandos; Text in German). Feldluftgaukommando 27-Der Leiter des Bauwesens B III 12-(Wehrgeologie), 1p. maps, Sept. 26, 1943. (typed ms.)
DWB, File No. 2738

Maps showing the thaw process from March 21-May 1 in central Russia are presented. Areas of homogeneous snow cover, first thaw, snow melt, mud period, hardening of the ground, hard and wet ground, and hard and dry ground are indicated.

SIP U6577

Schröder
METHODS FOR DRAINING EMPLACEMENTS, SUPPORTING SURFACES, ETC. DURING THE THAW WEATHER AND SOFTENING PERIOD ON THE EASTERN FRONT. (Verfahren zur Entwässerung von Stellungen, Stützpunkten usw. während der Tauwetter- u. Aufweichperiode an der Ostfront; Text in German). Inspekteur der Landesbefestigung Ost, O. K. H./Jn Fest (Geol.), 3p. appendices 1-2, tables, diagrs. May 18, 1942. (typed ms.)
DWB, File No. 2738

Methods for constructing drainage shafts by blasting in order to drain emplacements, supporting surfaces, roads, railroads, and airports in the presence of a frozen-ground layer are discussed. A cylindrical cardboard cartridge, 150 cm. long, filled with dynamite charges is used for frozen ground depths up to 1.20 m. and small-diam. shafts; a cartridge used for well-sinking purposes is used for frost depths of 1.20-2.50 m. and large-diam. shafts. The shaft is filled with gravel to permit water seepage into the unfrozen layer beneath. Frost penetration depths in various locations of Russia, Finland, and Norway are tabulated.

SIP U6578

Ackermann, A. S. E.
REMARKABLE FORMATION OF ICE ON A SMALL POND. Nature, 90:411 incl. diagr. Dec. 12, 1912. (Letters to the editor)
DLC, Q1.N2, v. 90

A clean, clear ice formation, 0.25 in. thick, and with dovetail ribs regular in form and dimensions was obtained from a small pond. Six lines of ribs ran from end to end of the 4-ft. long pond. The water in the pond had gradually percolated away, and left an air space of about 0.125 in. beneath the under surface of the ice.

SIP U6579

Aitken, John
THE INFLUENCE OF ICEBERGS ON THE TEMPERATURE OF THE SEA. Nature, 90:513-515 incl. diagr. Jan. 1913. (Letters to the editor)
DLC, Q1.N2, v. 90

Carpenter's experiments on the influence of ice in a tank of sea water are reviewed. The results of Barnes' investigations on changes in sea-water temperatures near icebergs are compared with those of other investigators and the differences are discussed. Water currents developing from the melting of colored ice anchored in sea water indicate that ice-cooled sea water rises regardless of the temperature at which the melting takes place and acquires the temperature of the warmer water through which it rises.

SIP U6580

Barnes, H. T.
ICEBERG MELTING. Nature, 90:671-673 incl. illus. tables, graph, Feb. 1913. (Letters to the editor)
DLC, Q1.N2, v. 90

A photograph of an iceberg shows an overhanging ridge caused by underwater melting and the lapping of the warmer water waves against the ice. This ridge is always found in icebergs which have not recently turned over. A microthermogram recorded near icebergs shows that the temperature of the sea water rises slightly in the presence of ice.

SIP U6581

[Heim, Albert] and [Arnold Fanck]
BLUE BANDS AND GLACIER GRAIN. (Blaubläter und Gletscherkorn; Text in German). Berge der Welt, 7:59-66, 1952.
DLC, G505.B4, v. 7

Blue bands are attributed by Fanck to pressure spots or slip bands which may occur within the ice in any direction. The bands are formed at great depths within glaciers by a slow process of pressure or displacement of the ice masses, which releases heat and causes the ice to melt. The meltwater refreezes and the blue band increases in thickness. The thickness is nearly always uniform, varying between 1 cm. and 2 m. Icebergs consisting of deep blue, crystalline ice are described, and their formation is explained on the basis of the same theory. The grain of Alpine glaciers increases with glacier length according to Heim.

SIP U6582

Salomon, Wilhelm
ARCTIC SOIL FORMS IN THE ALPS. (Arktische Bodenformen in den Alpen; Text in German). Sitzber. heidelberg. Akad. Wiss., Math. naturw. Klasse, No. 5:1-31 illus. diagrs. 1929. [10] refs.
DLC, AS182.H4, 1929

Arctic soils are classified as stationary soil masses with internal movement, and forms related to solifluction. Meinardus' structural soils and Högbom's celled soils fall into the former category, and striped soils, stone polygons, flow-earth ridges, sliding boulders, and rock glaciers into the latter. The typical celled soils and rock glaciers as defined by Solomon are not found in the Alps.

SIP U6583

Bagossy, Béla
AN APPARATUS FOR REMOTE MEASUREMENT OF RIME THICKNESS ON POWER LINES. (Zuzmaravastagság-méró készülék; Text in Hungarian and German). Időjárás, 43:229-230, 263-264 incl. illus. diagr. Nov.-Dec. 1939. 1 ref.
DLC, QC851.M125, v. 43

A device based on the cathetometer principle and used for measuring ice deposits on power lines is described. A telescope is aimed at the outer edge of the iced line, and the total diam. is read from a mm.-scale after the telescope is sighted on the opposite edge, parallel to the vertical plane of the first setting.

SIP U6584

Fábiánics, Ferenc
THE SNOW CONDITIONS OF BUDAPEST. (Budapesti havazások; Text in Hungarian and German). Időjárás, 44:154-163 incl. tables, graphs, July-Aug. 1940. 2 refs.
DLC, QC851.M125, v. 44

The distribution of precipitation from Oct.-April for 1900-1940 is analyzed and graphed. The 40-yr. average values of distribution are 11.7% for snow, 18.5% for snow-rain, and 69.8% for rain. Snow-cover depths on individual winter days from 1900-1940 are plotted. A summary of data on number of days with snowfall, snow cover, maximum depths and their dates, and dates of first and last snowfall is included.

SIP U6585

Gorinov, A. V.
ICE CROSSINGS. (Ledяnye perepravy; Text in Russian). p.346-351 incl. table, diagrs. (In: Proektirovanie zheleznykh dorog, by A. V. Gorinov, Moscow, Transzheldorizdat, vol. 2, 1948)
DLC, TF200.G6, 1948

The use of ice crossings for railroads in the USSR is facilitated by the severe climatic conditions. Ice must be at least 25 cm. thick and water 1 m. deep. Ice-cover thickness for various loads is tabulated and varies from 5 cm.-125 cm. for traffic of men without loads to loaded trains of 20 freight cars. The preparation of the roads above the ice and access to river crossings including scaffolding by driving piles through ice are described.

SIP U6586

Pereselencheskoe Upravlenie Glavnogo Upravleniя Zemleustroйstva i Zemledeliя
ASIATIC RUSSIA, VOL. 3 (Aziatskaя Rossiя, Vol. 3; Text in Russian). St. Petersburg, 1914, 155p.
DLC, DK750.A3, 1914

Approximately 3000 references published from the 17th century to 1913 are arranged under the main headings of Climate, Soil, Vegetation, Permafrost and History of Asiatic Russia, and subarranged alphabetically by author. Indexes to the preceding 2 volumes of Asiatic Russia on aspects of geographic locales, significant investigators, illustrations, graphs, and diagrams are included.

SIP U6587

Hrudička, Bohuslav
THE RIME PROBLEM. (Zur Nebelfrostfrage; Text in German with English and French summaries). Gerlands Beitr. Geophys. 51:335-342 incl. tables, graph, diagrs. 1937. [50] refs.
DLC, QC801.B3, v. 51

The survey of studies on rime deposits includes mathematical analyses, chemical analyses, quantity determinations, and geographical studies of rime deposits. Observations made during 1934-1937 in Moravia (Czechoslovakia) are discussed. Specific ice loads on electric lines are classified into weak (< 100 gm./m. day), moderate (101-500 gm./m. day), severe (501-1000 gm./m. day) and dangerous (> 1000 gm./m. day). The beginning and end of winter are more dangerous than midwinter. Dangerous loads were attained even at elevations of 450-549 m.

SIP U6588

Fábiánics, Ferenc
THE SUB-ZERO GROUND TEMPERATURE IN BUDAPEST. (A 0° alatti hőmérséklet a talajban; Text in Hungarian and German). Időjárás, 45:141-147, 176-177 incl. tables, graphs, July-Aug. 1941. 3 refs.
DLC, QC851.M125, v. 45

The position of the 0°C isotherms is analyzed on the basis of soil temperature data from 1912-1941. Temperatures were measured with soil thermometers at depths ranging from 2-400 cm. The ground frost number is a numerical value expressing the extent of ground freezing and is obtained from the thickness of the ground frost layer by adding the frozen layer thicknesses for all days during a winter. This value permits a comparison of winters. The average depth of frost penetration, maximum depths on individual days, ground frost numbers, and 0°C isotherms are plotted. A relationship is established between the curve of the average ground-frost numbers and that of the average snow depth, which indicates the high insulation quality of the snow cover.

SIP U6589

Higashi, Akira
ON THE THERMAL CONDUCTIVITY OF SOIL, WITH SPECIAL REFERENCE TO THAT OF FROZEN SOIL. Trans. Am. Geophysl. Union, 34:737-748 incl. illus. tables, graphs, diagrs. Oct. 1953.
DLC, QE500.A6, v. 34

The thermal diffusivity of frozen and wet soil was measured and their thermal conductivity computed. The specially designed apparatus and experimental procedure are described. The variation of the thermal diffusivity of the frozen soil in relation to the direction of heat flow is comparatively small. (See also SIP U4127 and U4128)

SIP U6590

Vittenburg, P. V.
YAKUTSK EXPEDITION OF THE ACADEMY OF SCIENCES OF THE USSR. (Iakutskaя ekspediцiя Akademii Nauk SSSR; Text in Russian). Materialy po Izucheniю Iakutskoй Avtonomnoй Sovetskoй Sotsialisticheskoй Respubliki, 1:1-157, map, appendix, 1925. 1 ref.
DLC, DK771.Y2A18, v. 1

Several expeditions were made under the supervision of the Academy during 1925-1929. Results of these studies are reviewed and the regions investigated are mapped. The objectives of the investigations were the study of permafrost and hydrometeorological conditions in the coldest area of the world.

SIP U6591

Grigor'ev, A. A.
GEOLOGY, RELIEF AND SOILS OF THE NORTHWESTERN PART OF THE LENA-ALDAN PLATEAU AND VERKHOYANSK RANGE. (Geologiia, rel'ef i pochvy sev.-zapadnoĭ chasti Lensko-Aldanskogo plato i Verkhoianskogo khrebta; Text in Russian with English summary). Materialy po Izucheniiu Iakutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 4:15-211 incl. illus. tables, graphs, maps, diagrs. 1926. 12 refs.
DLC, DK771.Y2A18, v. 4

The territory investigated in 1925 was located mainly in a permafrost region and ranged up to 1100 m. in elevation. The northern parts of the Lena-Aldan plateau are characterized by spots of fossil ice which are assumed to be remnants of the firn snow of the glaciation period. Permafrost has modified the relief of the area, particularly in regions of clay soil. Permafrost conditions and the influence on soil structure were investigated through soil profiles taken from the surface to the upper layers of permafrost.

SIP U6592

Vize, V. Iu.
HYDROLOGICAL OUTLINE OF THE LAPTEV AND EASTERN SIBERIAN SEAS. (Gidrologicheskiĭ ocherk moria Laptevykh i Vostochno-Sibirskogo moria; Text in Russian with English summary). Materialy po Izucheniiu Iakutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 5:1-86 incl. tables, graphs, maps, 1926. 126 refs.
DLC, DK771.Y2A18, v. 5

Results of observations made since 1637 are summarized. Thermal conditions, salinity and their influence on ice cover formation are discussed. A marked stratification of the water in the Laptev and the western part of the Eastern Siberian seas effects a rapid formation of ice cover in autumn. Large amounts of fresh water from Siberian rivers lowers the salinity and favors ice-cover formation. The low salinity and small exchange between coastal and open sea water contributes to the formation of a wide strip of coastal ice along Siberia. Variations in navigation conditions for about 300 yr. are given. The interrelations between the state of ice, and temperature, precipitation, wind, and ice conditions in the Atlantic were analyzed and correlation coefficients calculated.

SIP U6593

Krasiuk, A. A.
SOILS OF THE LENA-AMGA WATERSHED. (Pochvy Lensko-Amginskogo vodorazdela; Text in Russian with French summary). Materialy po Izucheniiu Iakutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 6:1-176 incl. illus. tables, graphs, maps, diagrs. 1927. 8 refs.
DLC, DK771.Y2A18, v. 6

The soils of the region were studied and classified with emphasis on the distribution of permafrost. Permafrost was found at greater depths on slopes, particularly those with southern exposure. The active layer was thicker in sandy and dry soils, and under meadow vegetation. Permafrost usually occurred at depths of 40-70 cm., but in some meadows the frozen layers were found at 130-150 cm. Permafrost was found in taiga as compact frozen masses, as masses with small ice crystals, or with ice bands 1-2 cm. thick.

SIP U6594

Barnes, H. T.
ON THE DENSITY OF ICE. Phys. Rev. 13:55-59 incl. table, diagr. July 1901.
DLC, QC1.P4, v. 13

The influence of age on the density of ice is discussed. Density determinations of new and 2-yr. old river ice were obtained by weighing the ice samples directly in water at 0°C. The density of old and new river ice is the same and may be taken as 0.91661 ± 0.00007. This value agrees within 0.0002 with Bunsen's measurements and with Nichols' value for natural river ice not newly cut.

SIP U6595

Pierce, J. C.
PNEUMATIC SWITCH CLEANER. Compressed Air Mag. 58:280-281 incl. illus. diagr. Oct. 1953.
DLC, TJ981.C7, v. 58

Snow Blowers delivering compressed air intermittently to rail switches keep the points in good condition by blowing away snow and grit from beneath the points and from between the points and stock rails. An anti-freeze injector introduces a small quantity of denatured alcohol into the air stream and prevents the mixture of compressed air and atmospheric air from freezing on the tracks. The operation of the cycling tank providing a blowing time of about 0.1 of the build-up time is described.

SIP U6596

Gilkey, Arthur K.
JUNEAU ICE FIELD RESEARCH PROJECT, ALASKA 1952. Prog. Rept. 37p. incl. table, map, Jan. 1953. (Task Order N9onr-83001)
SIPRE files

A study of the regimen of Taku Glacier and its postglacial variations in length and volume with particular stress on its area of accumulation is presented. Standard tests on the winter snow layer for density, snow hardness, grain size and type showed that the snow cover was quite homogeneous. A pollen analysis of the snow layer and a movement survey of several points were made. The studies were conducted below the upper tributary reaches but above the firn limit. A variety of snow test equipment was evaluated. Precautions in caching equipment over the winter are enumerated; the use of coal dust is recommended to facilitate searching. Equipment and techniques to

facilitate living and traveling are discussed. Firn studies and the implementation of certain techniques for the study of internal glacial conditions were carried out on the Juneau Ice Field. A detailed list of the special studies undertaken is presented.

SIP U6597

Tammann, G.
THE MOLECULAR COMPOSITION OF WATER. (Zur Kenntnis der molekularen Zusammensetzung des Wassers; Text in German). Z. anorg. u. allgem. Chem. 158:1-16 incl. tables, graphs, 1926. 11 refs.
DLC, QD1.Z4, v. 158

The dependence of water volume on temperature and pressure indicates the existence of a molecule type which is marked by its large volume, and which occupies the space lattice of ice type I. This molecule type exists between 50° and the melting curve of ice as well as between 0-2500 kg./sq. cm. These limits are confirmed by the dependence of viscosity and ion friction on pressure and temperature. The influence of molecule type I on surface tension and refractive power is proportional to its concentration.

SIP U6598

Lagally, M.
RUPTURE PHENOMENA IN FLOW OF VISCOUS LIQUIDS. (Zerreisserscheinungen in Strömungen zäher Flüssigkeiten; Text in German). Z. angew. Math. Mechanik, 10:137-141 incl. diagrs. April 1930. 7 refs.
DLC, TA3.Z4, v. 10

A state of stress exists within a viscous liquid which is in slow motion. The formation of fissures in glacier ice is an example of the rupture of a viscous liquid. The principal mathematical derivations of Somigliana dealing with the uniform flow of a viscous liquid in a cylindrical channel as a function of gravity and atmospheric pressure are presented, and the state of stress existing in this flow is analyzed. The conditions under which rupture occurs as the result of tensile stresses are discussed on the basis of a plane liquid layer flowing down an inclined plane. It is shown that the angle of inclination of the base must exceed 45° before the liquid will rupture under the action of its own weight. (See also SIP U2422)

SIP U6599

Wright, C. S. and R. E. Priestley
GLACIOLOGY. Brit. Antarctic Expedition 1910-1913, London, Harrison & Sons, 1922, 581p. incl. illus. tables, graphs, maps, diagrs. [100] refs.
DLC, Q115.B87W7, 1922

A study of snow and ice forms is presented. The stages in the changes sustained by freshly precipitated snow or water and the ice formations themselves are discussed with particular reference to Antarctica. A genetic classification of land-ice formations applicable to all stages of the glacial cycle in all countries is developed. The sea-ice nomenclature presented is in agreement with Wordie's. A review of the properties of ice is appended. A group of 291 photographs illustrates the text.

SIP U6600

Dobrowolski, A. B.
ICE CRYSTALS. (Les cristaux de glace; Text in French). Arkiv Kemi, Mineral. Geol. 6, No. 7:1-53 incl. illus. diagrs. Oct. 23, 1916. [70] refs.
DLC, Q64.S876, v. 6

The observations and experiments of past investigators are summarized and a group of photomicrographs is presented. Symmetry, grouping, principal faces, twin crystals, geometric constant and polymorphism are discussed. The geometric constant of ice crystals and polymorphism of natural ice have not been determined.

SIP U6601

Tammann, G.
CONCERNING P. W. BRIDGMAN'S CRITICISM. (Über P. W. Bridgemans Kritik; Text in German). Z. physik. Chem. 88:57-62 incl. graphs, 1914. 4 refs.
DLC, QD1.Z45, v. 88

Bridgman's criticism of Tammann's equilibrium curves of ice types at pressures below 4000 kg./sq. cm. is analyzed. Four facts, independent of each other, are in agreement, and can only be explained by assuming the existence of a totally unstable ice form I' from ice III'. It is concluded that Bridgman has either shown the existence of 2 equilibrium curves which run close together, in agreement with Tammann, or the errors of Bridgman's pressure measurements are so large that he cannot make any assertions about the existence of 2 different equilibrium curves. (See also SIP U2566)

SIP U6602

Nacken, R.
THE GROWTH OF CRYSTAL POLYHEDRONS IN THEIR MELT. (Über das Wachsen von Kristallpolyedern in ihrem Schmelzfluss; Text in German). Neues Jahrb. Mineral. Geol. 2:133-164 incl. illus. tables, graphs, diagrs. 1915. [50] refs.
DLC, QE1.N4, v. 2

A piece of a uniform ice crystal was attached to a hemispherical cooler, filled with mixtures of ice, salt, solid CO_2 and ether. The cooler was placed into a thermostat at a temperature of -0.7°C. The wall of the vessel became covered with a slowly growing ice layer. The crystal pieces grew into hemispheres at -10°C. This phenomenon indicates the existence of temperature areas in which the crystallization speed depends only on the temperature gradient. The temperature of fusion must be equal for all directions. The released heat of crystallization of ice under the given conditions is not removed rapidly enough for the equilibrium state to be attained or exceeded.

SIP U6603

Bruk, B. L.
THE BIRSK-BIDZHAN REGION OF THE FAR EAST. (Birsko-Bidzhanskiĭ Raĭon Dal'ne-Vostochnogo Kraĭa; Text in Russian). Moscow, Komzet, 1928, 116p. incl. tables, maps. [10] refs.
DLC, DK771.B5R88, 1928

The results of preliminary investigations of climate, soil and botany, geomorphology and hydrology of the Amur region are presented. Warming of soil and other climatic changes are due to deforestation during the last 60 yr. Early autumn frosts and frost penetration up to 2 m. are characteristic for this region. Sporadic permafrost is encountered under moss marshes. Deep frost penetration furnishes construction problems, particularly in bridge construction.

SIP U6604

Timonov, V. E.
OUTDOOR HYDROTECHNICAL LABORATORIES AND THEIR SIGNIFICANCE IN THE INVESTIGATION OF SUMMER AND WINTER REGIME OF WATERS. (Gidrotekhnicheskie laboratorii otkrytykh tipov i ikh znachenie pri issledovanii letnego i zimnego rezhima vod; Text in Russian with English summary). Izvestiĭa Nauchno-Issledovatel'skogo Instituta Gidrotekhniki, 14:81-190 incl. illus. tables, graphs, maps, diagrs. 1934. [180] refs.
DLC, TC1.L4, v. 14

The scope of experimental hydrological investigations through outdoor laboratories is examined on the basis of practice in other countries. The activities of outdoor laboratories must be coordinated with those of an ice research institute for maximum utilization of water resources. Data on ice regimes of rivers, lakes and seas, frost action, ice formation, and engineering problems will be obtained through experiments in outdoor laboratories and an ice station on the Neva River for the evaluation of data. (See also SIP U2776 and U2777)

SIP U6605

Gerasimov, I. P. and K. K. Markov
GLACIAL PERIOD IN THE TERRITORY OF THE USSR. (Lednikovyĭ period na territorii SSSR; Text in Russian with English summary). Moscow-Leningrad, Izd-vo Akademii Nauk SSSR, 1939, 462p. incl. illus. tables, graphs, maps, diagrs. [1000] refs.
DLC, QE697.G3, 1939

An attempt is made to reconstruct the geographical features during the glacial period and to explain the wide distribution of permafrost in the USSR. The greatest extent covered by ice in Eurasia was 9.5 million sq. km. diminishing toward the east. Large areas of permafrost in Middle and Eastern Siberia are proof of deep frost penetration in soils unprotected by a glacial sheet, and subjected to a continental climate and small snowfall.

SIP U6606

Sumgin, M. I.
THE PERMAFROST PROBLEM AND ITS SIGNIFICANCE IN ENGINEERING AND FARMING IN BURIAT'-MONGOLIAN ASSR. (Problema vechnoĭ merzloty i ee znachenie v promyshlennom stroitel'stve i sel'skom khozĭaistve Buriat-Mongol'skoĭ ASSR; Text in Russian). p.210-223 incl. tables. (In: Trudy pervoĭ konferentsii po izucheniiu proizvoditel'nykh sil Buriat-Mongol'skoi ASSR, Vol. 1. Problemy Buriat-Mongol'skoĭ ASSR, Moscow-Leningrad, Izd-vo Akademii Nauk SSSR, 1935). 1 ref.
DLC, DK771.B8K6, 1935

Permafrost is sporadic west of Lake Baikal and absent along the shoreline; talik and pseudotalik islands are present in continuous permafrost east of Lake Baikal. The thickness of the active layer varies from 0.5-5.3 m. depending on soil type, moisture content, relief, slope inclination and orientation. Permafrost reaches a maximum thickness of 70 m. with an average of 40 m. east of Lake Baikal and a maximum thickness of 38 m. west of the lake. Average monthly and annual temperature values under natural and denuded soil surfaces in Irkutsk during 1887-1908 are tabulated for depths to 3.2 m. and in Chita during 1900-1908 for depths to 1.6 m.

SIP U6607

Tolstikhin, N. I.
GROUND WATER OF BURIAT'-MONGOLIAN ASSR. (Podzemnye vody Buriat-Mongol'skoĭ ASSR; Text in Russian). p.224-250. (In: Trudy pervoĭ konferentsii po izucheniiu proizvoditel'nykh sil Buriat-Mongol'skoĭ ASSR, Vol. 1. Problemy Buriat-Mongol'skoĭ ASSR, Moscow-Leningrad, Izd-vo Akademii Nauk SSSR, 1935). 35 refs.
DLC, DK771.B8K6, 1935

The physical and chemical properties of ground water in permafrost are discussed. The supply of suprapermafrost water depends largely on the temperature regime of the active layer. The asymmetry of northern and southern slopes of the Buriat'-Mongolian region is explained by the speed of thawing of suprapermafrost water. Intrapermafrost water is present in taliks and is consequently unevenly distributed. Subpermafrost water is usually under pressure, highly mineralized, contains the least O and bacteria and the most CO_2 and N. Various methods of utilizing ground water in permafrost regions are described.

SIP U6608

Tolstikhin, N. I.
MINERAL SPRINGS OF THE BURIAT'-MONGOLIAN ASSR. (Arshany Buriat-Mongol'skoĭ ASSR; Text in Russian). p.254-275 incl. illus. tables, maps. (In: Trudy pervoĭ konferentsii po izucheniiu proizvoditel'nykh sil Buriat-Mongol'skoĭ ASSR, Vol. 1. Problemy Buriat-Mongol'skoĭ ASSR, Moscow-Leningrad, Izd-vo Akademii Nauk SSSR, 1935)
DLC, DK771.B8K6, 1935

Mineral springs of the Buriat'-Mongolian ASSR as related to geological structure, chemical composition and permafrost are discussed. The occurrence and temperature regime of these springs is influenced by the presence of permafrost and deep frost penetration.

SIP U6609

Ravn, H. H.
FROST DAMAGES ON HIGHWAYS. (Frostskader paa veje; Text in Danish). Dansk Vejtids. 16:142-148, Aug. 1939. 6 refs.
DPR, Unclassed periodical

Frost action in the form of frost heaving, road breakup and surface softening is discussed individually. References are made to the theories of Johansson, Taber, Dahlberg and Beskow. Gravel roads in Norway were drained by drilling 1-in. holes through the frozen soil, 4 m. apart, and placing small explosive charges at the bottom.

SIP U6610

Nadezhnyĭ
FAR EAST. HYDROGRAPHY. (Dal'niĭ Vostok. Gidrografiâ; Text in Russian). St. Petersburg, Izdanie Glavnogo Upravleniâ General'nogo Shtaba, vol. 1, pt. 2, 1911. 687p. 37 refs.
DLC, DK752.A5, 1911

The physiographical conditions of the coastal region of the Okhotsk, Japan and Yellow seas are described. The hydrographic characteristics of the rivers of these sea basins and the Far East rivers of the Polar Ocean are analyzed. Ice conditions and possibilities for military landings as associated with weather, ice and relief are discussed.

SIP U6611

Sochava, V. B. and A. N. Lukicheva
GEOGRAPHY OF DWARF PINE. (K geografii kedrovogo stlanika; Text in Russian). Doklady Akademii Nauk SSSR, Novaia seriâ, 90:1163-1166 incl. map, 1953. 8 refs.
DLC, AS262.S3663, v. 90

The distribution of dwarf pine in northeastern Siberia is mapped. The presence of dwarf pine is associated with the occurrence of relatively deep snow cover.

SIP U6612

Maurstad, Alf
ATLAS OF SEA ICE. Geofys. Publikasjoner, 10, No. 11:5-17, illus. 1935. 2 refs.
DLC, QC801.N67, v. 10

An English sea-ice terminology is provided using terms which can be translated into corresponding existing terms in other languages. The terminology provides information as to character, appearance, dimensions, amount, and arrangement of ice. Freezing and melting, and other properties of ice in the sea are discussed.

SIP U6613

Turunov, A.
A NEW COPY OF THE IRKUTSK ANNALS BY BASNIN. (Novyĭ spisok Irkutskoĭ letopisi Basnina; Text in Russian). Sovetskaâ Aziâ, 3, No. 4:103-107 incl. table, 1927. 6 refs.
DLC, DK750.S6, v. 3

Dates of the freezing and opening of the Angara River are given for the period 1722-1825. The earliest freeze-up was Dec. 10, 1812; the latest breakup was April 17, 1742 and 1811. Freezing at times occurred only in Feb. The earliest opening was observed also in Feb.

SIP U6614

Ognev, G. N.
GEOLOGICAL OBSERVATIONS IN LENA-AMGA WATERSHED. (Geologicheskie nabliûdeniâ na Lensko-Amginskom vodorazdele; Text in Russian with English summary). Materialy po Izucheniû Âkutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 22:1-71 incl. illus. tables, map, diagrs. 1927. 11 refs.
DLC, DK771.Y2A18, v. 22

A geological expedition was made in 1925 to study the soil of the Lena-Amga watershed. Ice mounds, naleds, and large masses of fossil ice were frequently observed in permafrost areas. Numerous mineral springs along the Lena River remained unfrozen at temperatures of -55°C as far as 300 m. from their source. These springs produced thick naleds. The number and sizes of lakes are related to permafrost.

SIP U6615

Kuznetsov, S. S.
TYUNG RIVER AND ITS LEFT BANK. (Reka Tûng i ee levoberezh'e; Text in Russian with English summary). Materialy po Izucheniû Âkutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 26:1-79 incl. illus. tables, graphs, diagrs. 1929. 16 refs.
DLC, DK771.Y2A18, v. 26

The geology of the region along the river was studied during the summer of 1926. Soil profiles and permafrost distribution, for the most part at depths of 1-1.5 m., are given. The importance of permafrost on relief is discussed. It was found that frozen soil layers produced numerous lakes and swampy areas.

SIP U6616

Cox, John
NOTE ON AN APPARENTLY ACCIDENTAL FORMATION OF FRAZIL ICE IN A CRYOPHORUS. Trans. Roy. Soc. Can. 2d Ser. 10, Sect. 3:3-4, 1904.
DLC, AS42.R6, v. 10

A mass of ice was obtained which sank slowly to the bottom of the cryophorus bulb during a lecture experiment. The ice, covered with about 0.33 in. of clear water, remained on the bottom of the bulb. No explanation is offered for the formation of the heavy ice and many attempts at duplication failed to produce it again.

SIP U6617

Shaw, A. Norman
A NOTE ON THE FORMATION OF HEAVY ICE IN A CRYOPHOROUS. Trans. Roy. Soc. Can. 3d Ser. 18, Sect. 3:187-189, 1924.
DLC, AS42.R6, v. 24

A mass of ice was obtained with a density apparently equal to that of water during a demonstration with a cryophorus. This ice upon melting underwent a density change from 1 down to normal ice density. A similar phenomena occurred 20 years earlier. The necessary conditions for the production of this heavy ice are not known, though unusual supercooling might be a contributing factor. (See also SIP U6616)

SIP U6618

Shutt, Frank T.
ON THE PURIFICATION OF PEATY WATERS BY FREEZING. Trans. Roy. Soc. Can. 3d Ser. 1, Sect. 3:31-33 incl. tables, 1907.
DLC, AS42.R6, v. 1

Ottawa and Rideau river waters were analyzed in Nov. Ice blocks from these rivers were analyzed in Feb. The results indicate that freezing considerably reduces the albuminoid NH_3, total solids and Cl contents and eliminates the mineral matter. The degree of purification increases with the water depth, slowness of formation and ice thickness. The lower part of the ice block is purer than the upper part.

SIP U6619

Shutt, Frank T.
THE FERTILIZING VALUE OF SNOW. Trans. Roy. Soc. Can. 3d Ser. 1, Sect. 3:35-38 incl. tables, 1907.
DLC, AS42.R6, v. 1

Freshly fallen snow was collected at the Central Experimental Farm near Ottawa (Ont.) in 1906-07 winter, and analyzed for its N content as free NH_3, albuminoid NH_3, NO_3, and NO_2. Free NH_3 constituted the most and albuminoid NH_3 the least of the total N. A winter's snow furnished about 1 lb. N/acre. Total annual precipitation was estimated at about 4 lb. N/acre.

SIP U6620

Kersten, Miles S.
DETERMINATION OF THERMAL PROPERTIES OF SOILS FOR INVESTIGATION OF AIRFIELD CONSTRUCTION IN ARCTIC AND SUBARCTIC REGIONS. Eng. Exp. Sta. Univ. Minn. 90p. incl. illus. tables, graphs, Jan. 1948. 2 refs.
DLC, TA710.M53, 1948

Variations of the coefficient of thermal conductivity were determined by tests conducted on 14 soils. The coefficient of thermal conductivity increases with temperature above freezing, shows little change below freezing, increases with moisture content when at a constant density, increases with density when at constant moisture content, and is higher for well graded soils with angular particles than for poorly graded soils with rounded particles. The specific heats are approximately equal for a variety of soils and decrease with decreasing temperatures. The thermal conductivity results obtained for the soils tested can be used as a basis for thermal conductivity estimates of other soils with similar physical characteristics of mineral composition, gradation and particle surface.

SIP U6621

Lönnfors, Frans
AIR HOLE FORMATIONS ON ICE. (Om lufthålsbildningar i isen; Text in Swedish). Terra, 64:142, 1952. (Notes)
DLC, G23.G5, v. 64

Conical formations resembling miniature volcanoes were observed on thin river ice at Tynka, Väärijaki (Finland) on March 18, 1952. They were about 8 cm. in diam. at the base, 2.5 cm. at the top and 12 cm. high. The outer shell and most of the cone were solid ice; the porous contents consisted of flakes of crystals. Eruptions of air bubbles and water drops contributed to the growth. The phenomenon may be explained by air being trapped between water and ice during freezing. Formations of similar nature have been observed down-stream from waterfalls and rapidly flowing streams.

SIP U6622

Holmsen, Gunnar
SOLIFLUCTION, SLOW SLIPPING OF EARTH LAYERS. (Om jordlags langsomme glidning, solifluktion; Text in Norwegian). Norske Geografiske Selskabs Aarbog, 25 (1913-1914):25-41 incl. illus. 1915.
DLC, G25.N8, v. 25

Solifluction is controlled by regelation and gravity. The action in subalpine, alpine and arctic soils is discussed. The movement has not been measured systematically, and occasional observations gave varying results. An annual distortion of more than a few dm. is considered large-scale. A railroad track in Spitsbergen was distorted, and the floor in the Swedish observatory was deformed by solifluction.

SIP U6623

Hansen, Andr. M.
THE SNOW LINE IN NORWAY. (Snegraensen i Norge; Text in Norwegian). Norske Geografiske Selskabs Aarbog, 13 (1900-1902):59-73 incl. graph, map, 1902.
DLC, G25.N8, v. 13

Isopleths of perennial snow existing at favorable locations are mapped for Norway and discussed as the natural or normal snowline. The height of the snowline increases regularly from the coast toward the interior and depends on the balance between winter precipitation and summer melting. This function is controlled by the contrast between ocean and land rather than by latitude which results in isopleths running SSW-NNE.

SIP U6624

Clark, W. H.
ELECTRIC HEAT PREVENTS POND FREEZING. Elec. West, 111, No. 4:100 incl. diagr. Oct. 1953.
DLC, TK1.E495, v. 111

An electric heating system was designed to keep a 72 x 24-ft. sawmill pond from freezing at temperatures down to -20°F. Experimental data showed that approximately 50 kw./sq. ft. of pond area were required. Two 24-kw. heaters were piped to operate together or independently during off-peak mill hours.

SIP U6625

Richardson, Harold W.
BUILD RAILROAD THROUGH NORTH CANADIAN BUSH. Construction Methods and Equipment, 35, No. 10:62-64, 67-68, 70-72, 74-75, 78 incl. illus. map, Oct. 1953.
DLC, TA1.C77, v. 35

The construction of a 145-mi. railroad from Sherridon to Lynn Lake (Manitoba) is described. Muskeg was bladed or cast to the side when under 6 ft. deep. The top mat was left undisturbed in deeper bogs. Permafrost, which lies from 18 in.-6 ft. under the surface, was left undisturbed as a solid foundation under embankments. The unfrozen soil was removed in cuts and the frozen ground allowed to thaw until another slice could be taken out.

SIP U6626

Perunova, M. S.
PECULIARITIES OF THE SOIL TEMPERATURE VARIATIONS DURING DRY YEARS IN THE EASTERN AND SOUTHEASTERN PARTS OF EUROPEAN USSR. (Osobennosti rezhima temperatury pochvy v zasushlivye gody na vostoke i ûgo-vostoke Evropeĭskoĭ chasti SSSR; Text in Russian with English summary). Izvestiâ Glavnoĭ Geofizicheskoĭ Observatorii, No. 3:14-38 incl. tables, graphs, 1931. 11 refs.
DLC, QC801.L467, 1931

Data on soil temperatures and snow-cover depths for Nikolaevskoe, Saratov province (1896-1924); Bezenchuk, Samara province (1904-1924); and Luganak, Donets region (1904-1915) are tabulated and analyzed. The deepest frost penetration (185 cm.) occurred at Bezenchuk. Snow cover reached maximum depths of 48 cm. at Bezenchuk, and 70 cm. at Nikolaevskoe. The effect of snow-cover depth on soil freezing was not always obvious. A comparison of the data showed the importance of general weather situations. The depth of snow had a pronounced effect on soil temperatures during the following summer. Soil temperatures increased more rapidly in April-July following winters with scant snow cover.

SIP U6627

Obruchev, V. A.
FORMATION OF ANGARA AND BAIKAL ICE... (Nashi svedeniâ ob obrazovanii angarskago i baĭkal'skago l'da...; Text in Russian with German summary). Izvestiâ Vostocho-Sibirskago Otdela Russkago Geograficheskago Obshchestva, 23, No. 4:1-42 incl. tables, 1892. 27 refs.
DLC, G23.G28, v. 23

Anchor-ice studies in Siberia and parts of Western Europe are reviewed, and theories of formation are discussed. Observations on the Angara River and Lake Baikal indicated that anchor-ice formation occurs in supercooled water moving slowly. Anchor ice grows on thin ice plates up to 1 in. in size. Anchor ice can develop in Lake Baikal at depths not greater than 150 m. The freezing processes of the Angara River are associated with anchor ice. Freeze-up is accelerated by anchor ice floating to the water surface. The Angara River usually froze over on Jan. 11 according to data of 129 yr. Extreme dates were Dec. 14 and Feb. 13. Lake Baikal usually remains ice-covered from mid-Dec.-Jan. to early May. Both lake and river ice attain a maximum thickness of about 1 m. Changes in wind direction and variations in level effect the appearance of large fissures in the lake ice cover.

SIP U6628

Abolin, R. I.
PRECIPITATION. (Atmosfernye osadki; Text in Russian). Trudy Komissii po Izucheniû Âkutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 10:42-50 incl. tables, 1929. 4 refs.
DLC, DK771.Y2A17, v. 10

Precipitation data of 20 stations in central and eastern Siberia within the period 1871-1923 are tabulated and discussed. The snow cover in the basin of Lena-Vilyui was observed from Oct.-May and reached a maximum depth (34-42 cm.) in Feb.-March. The Lena River was navigable for an average of 155 days (May 28-Oct. 30) near Yakutsk and 172 days (May 19-Nov. 6) near Olekminsk. The Vilyui River was ice-free for 152 days (May 22-Oct. 21) near Vilyuisk.

SIP U6629

Abolin, R. I.
PERMAFROST. (Postoûnnaâ merzlota grunta; Text in Russian). Trudy Komissii po Izucheniû Âkutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 10:57-64 incl. table, 1929.
DLC, DK771.Y2A17, v. 10

Most of the Lena-Vilyui plain is in a permafrost zone. A negative heat balance, and certain relief, hydrographic and biologic factors are favorable for permafrost. Snow cover is a factor controlling the extent of permafrost. Permafrost was not observed at Turukhansk where the annual air temperature is -7.7°C and the snow cover is up to 2.34 m. thick. Permafrost occurred at Urga where the annual air temperature is -2.5°C and the snow cover reaches only 19 cm. The thickest permafrost layer (204 m.) was near Yakutsk. The thickness of permafrost in the Aldan River Basin varied from 18-61 m. The depth of the active layer depends largely on soil composition, moisture content and vegetative cover. A table shows the variations in the depth of the active layer under different soils and vegetative covers.

SIP U6630

Abolin, R. I.
EASTERN PLATEAU OF THE LENA-VILYUI AREA. (Vostochnaîa chast' plato Lẹno-Vilûĭskoĭ ravniny; Text in Russian with English summary). Trudy Komissii po Izucheniû Iakutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 10:144-268, 341-343 incl. illus. tables, graphs, 1929.
DLC, DK771.Y2A17, v. 10

The ecology of plant life of the region is discussed. Soil profiles show that the distribution of permafrost and its depth depend on soil composition and vegetation. Permafrost effects the distribution of plant species. The frozen layers prevent deep penetration of meltwater into the soil. Subterranean water in sandy soil accumulated at depths of 25-50 cm. during early summer.

SIP U6631

Shutt, Frank T. and R. L. Dorrance
THE NITROGEN COMPOUNDS IN RAIN AND SNOW. Trans. Roy. Soc. Can. 3d Ser. 11, Sect. 3: 63-71 incl. tables, 1917. 2 refs.
DLC, AS42.R6, v. 11

The N compounds in rain and snow were determined at the Central Experimental Farm near Ottawa from 1907-1917. Yearly estimates of the amount of N contributed by free NH_3, albuminoid NH_3, NO_3, and NO_2 are tabulated. The average 10-yr. mean shows that snow contains 0.497 p.p.m. of N, 48% of which is in the form of free NH_3, 20% as albuminoid NH_3, 32% as NO_3 and NO_2. Factors which influence the N concentration of the various precipitations were analyzed. Black deposits apparent in the melted snow indicate the cleansing property of snow. The number of lb. N/acre is fairly constant from year to year and does not vary with the total yearly precipitation. The average winter snowfall at Ottawa contributes about 1.101 lb. N/acre.

SIP U6632

Vandervleck, J.
BACTERIA OF FROZEN SOILS IN QUEBEC. Trans. Roy. Soc. Can. 3d Ser. 11, Sect. 4:15-37 incl. tables, graphs, diagrs. 1917. 6 refs.
DLC, AS42.R6, v. 11

The results of bacteria count investigations in frozen soil from 1909-1913 are reviewed and summarized. Experiments conducted in Quebec in the winter of 1916-17 are described and the results discussed. Bacteria increase rapidly in Jan. in all frozen and unfrozen soils containing raw material for decomposition. A moderate increase occurs during March. Severe frost checks bacterial development and a high water content counteracts the frost action. A sudden severe frost kills most of the bacteria in the exposed soil. An increase in soil moisture is followed by an increase in bacteria; thawing is followed by a reduction in bacteria.

SIP U6633

Tyrrell, J. B.
FROZEN MUCK IN THE KLONDIKE DISTRICT, YUKON TERRITORY, CANADA. Trans. Roy. Soc. Can. 3d Ser. 11, Sect. 4:39-46, illus. table, 1917.
DLC, AS42.R6, v. 11

Klondike muck is 10-100 ft. thick and is composed largely of vegetable material and ice (44% by weight). Layers of clear ice are formed as spring water rises and freezes before reaching the surface. The muck is superimposed on gravel and rock permanently frozen to about 200 ft. below the surface. Mining shafts can readily be sunk through the muck with pick and shovel.

SIP U6634

Harris, Frank E. and Berni J. Alder
DIELECTRIC POLARIZATION IN POLAR SUBSTANCES. J. Chem. Phys. 21:1031-1038 incl. tables, graph, June 1953. 11 refs.
DLC, QD1.J94, v. 21

A statistical mechanical theory of the static dielectric constant of polar substances is presented. The theory differs from the previous theories of Kirkwood and Frŏhlich in that a precise evaluation of the distortion polarization term is made. The theory is applied to the dielectric constant of ordinary and heavy water and yields 2% agreement with experiment over the entire temperature range. The difference between the dielectric constant of water measured at visible and microwave frequencies can be ascribed to vibrations, such as the bending of the O-H-O bond. The calculated dielectric constant of ice agrees with experimental values within a mean deviation of 3% over a considerable temperature range using an approximate evaluation of the Pauling model for ice. (Authors' abstract)

SIP U6635

Schostakŏwitsch, W. B.
THE ETERNALLY FROZEN GROUND OF SIBERIA. (Der ewig gefrorene Boden Siberiens; Text in German). Z. Ges. Erdkunde Berlin, No. 7-8:394-427 incl. illus. tables, graphs, map, diagrs. 1927. 34 refs.
DLC, G13.G5, 1927

A complete summary of contributions made by Russian scientists to the investigation of permafrost phenomena is presented. The extent, cause, depth and temperature of permafrost are discussed. The effects of permafrost, including its influence on rivers and underground waters, are analyzed. The limits of permafrost distribution are determined by the effect of air temperature and snow depth. This effect is expressed numerically by dividing the temperature value by the snow depth, or by dividing the mean air temperature value for Nov.-March by the value of the mean snow depth for the same period. A map indicates permafrost distribution using these quotients.

SIP U6636

Artamonov, D. S.
ICE COVER IN RIVERS OF THE VOLGA BASIN. (Deĭstvie ledi̊anogo pokrova na rekakh Volzhskogo basseĭna; Text in Russian). Trudy Nauchno-Issledovatel'skogo Instituta Gidrotekhniki, Sbornik po Ledotekhnike, 1:97-164 incl. tables, map, diagrs. 1933. 9 refs.
DLC, TC1.L43, v. 1

The characteristics of the ice regime were determined from observational data since 1877. Autumn freeze-up of the large rivers in the basin occurs during Nov.-Dec. and earlier in the northern parts. Spring breakup occurs during April except in the region near Astrakhan, where breakup takes place in late March. The Volga River is navigable for 193-257 days; the Kama River for 172-187 days; the Vyatka and Belaya rivers for 183-190 days, and the Oka River for 205-213 days. The ice cover in most parts of the basin is 70-100 cm. thick near the end of winter, the lower values being in the south and west. The influence of ice cover on navigation, hydroelectrical constructions and preventive measures against ice damages on ships are discussed.

SIP U6637

Jansson, Martin
THE THERMAL CONDUCTIVITY OF SNOW. (Über die Wärmeleitungsfähigkeit des Schnees; Text in German). Öfversigt Kgl. Vetenskaps-Akad. Förh. 58: 207-222 incl. tables, graphs, diagrs. 1901. 18 refs.
DLC, Q64.S87, v. 58

The thermal conductivity of snow was determined in the laboratory by means of Christiansen's method. The apparatus consisted of 3 Cu plates into which thermoelements were inserted and connected to a galvanometer. The snow was inserted between the first 2 plates and cylindrical brass vessels were soldered to the upper and lower plate, through which water was circulated to keep the plates at a constant temperature. A glass plate was used for comparative purposes. The thermal conductivity was calculated as a function of the distance between the plates and the temperature differences between them. The thermal conductivity values obtained are plotted as a function of snow density, and are compared with values obtained by Abels and Hjeltström. An equation is given for thermal conductivity as a function of density.

SIP U6638

Stüve, G.
THE FORMATION OF SNOW. (Die Entstehung des Schnees; Text in German). Beitr. Phys. frei. Atmosphäre, 15:170-175, illus. 1929.
DLC, QC851.B4, v. 15

The atmospheric processes leading to the formation of snow crystals are analyzed on the basis of 42 photomicrographs of snow crystals made on 6 different days. An ordinary microscope with an improvised cooler was used. A summary of the observations shows that during 2 observations the prismatic full crystals formed at -20°C and that their irregularly composed form indicates a solid condensation nucleus. The nucleus of the other forms consists of fine plates which, at very low temperatures in moderate latitudes, form predominantly at high altitudes, and which grow while falling through layers supersaturated with respect to ice. Snow cannot form if plates are not available in the higher layers. The condensation will lead to the formation of supercooled rain, which will form glaze on the ground.

SIP U6639

Devik, Olaf
THE CALCULATION OF THE LONGITUDINAL PROFILE OF A RIVER AND ITS CHANGE DURING INITIAL ICE FORMATION. (Die Berechnung des Längenprofils eines Flusses und dessen Änderung bei einsetzender Eisbildung; Text in German). Beitr. Phys. frei. Atmosphäre, 19:220-232 incl. tables, graphs, diagrs. 1932. 3 refs.
DLC, QC851.B4, v. 19

An equation is derived which is valid for the individual river cross section, and which indicates a relationship between mean depth, width, fall, and volume of water. The equation is formulated in such a manner that its validity is retained when the river is partially or wholly covered with ice. The differential equation of the longitudinal profile is subsequently solved, and several practical applications are given.

SIP U6640

Philipp, H.
THE EFFECTS OF ICE. (Die Wirkungen des Eises; Text in German). p.257-288. (In: Handbuch der Bodenlehre, vol. 1, ed. by E. Blanck, Berlin, Julius Springer, 1929). 201 refs.
DLC, S591.B6, v. 1

The effects of glacier ice, snow, firn, and frozen ground water on the bedrock are discussed, and a summary of existing literature on the subject is included. Factors of the ice and bedrock which are analyzed include the physical conditions and structure of glacier ice, mechanism and speed of glacier movement, glacier thickness, nivation, ground frost, and the mineralogical composition, structure, and texture of the bedrock. Glacial erosion includes the action of coherent ice and firn masses, and that of nivation and ground frost. The total effect of glacial erosion is summarized.

SIP U6641

Blanck, E.
PHYSICAL WEATHERING. (Physikalische Verwitterung; Text in German). p.162-191 incl. illus. tables, diagrs. (In: Handbuch der Bodenlehre, vol. 2, ed. by E. Blanck, Berlin, Julius Springer, 1929). 87 refs.
DLC, S591.B6, v. 2

The physical effects which lead to rock fragmentation without chemical changes are analyzed. Included are frost weathering as manifested by nivation, temperature weathering as the result of solar radiation, and the crystallization of salts leading to fissure formations. Frost-action fissures result when water-filled pores are connected to the surface of rocks by capillaries. The fissure effect of freezing water is a function of the water capacity of the rock type. The process of regelation and subsequent weathering is prevented in regions with deep permafrost formations at low temperatures. Weathered rocks in Spitsbergen and Greenland are described.

SIP U6642

Hebner, Erich
THE DURATION OF THE SNOW COVER IN GERMANY. (Die Dauer der Schneedecke in Deutschland; Text in German). Forschungen z. deut. Landes u. Volkskunde, 26, No. 2:101-168 incl. tables, maps, 1928. 19 refs.
DLC, G58.F73, v. 26

The number of days with snow cover as based on observations from 1885-1919 at 150 selected stations throughout Germany is analyzed and mapped. The method of drawing the map is described and the snow conditions of individual regions are discussed. The duration of the snow cover in Germany is primarily dependent on temperature and secondarily on precipitation.

SIP U6643

Hamberg, Axel
STUDIES ON SEA ICE AND GLACIER ICE. (Studien über Meereis und Gletschereis; Text in German). Bihang Kgl. Svenska Vetenskaps-Akad. Handl. 21, Pt. II, No. 2:3-13, illus. diagr. 1895. 16 refs.
DLC, Q64.S86, v. 21

The snow-like appearance of drift ice surfaces during summer is attributed to the melting of sea water inclusions in ice protruding above the water at air temperatures of 0°C or above, and being replaced by air. The O content of gas bubbles in fresh sea ice and in glacier ice was determined. The O content of bubbles in sea ice exceeded that of air, but was smaller than the quantity of gas absorbed by the sea water. The gas enclosed by glacier ice was approximately of the same composition as atmospheric air. A theory of glacier movement is presented which is based on the presence of thin saline layers in glacier ice and differential pressure exerted by the different glacier grains upon each other producing melting and regelation phenomena. The melting phenomena of fresh-water ice are explained as analogous to those of glacier ice.

SIP U6644

Potter, J. Graham
SNOW COVER IN CANADA. Eng. and Contract Record, 66, No. 10:72-74, 124 incl. tables, maps, Oct. 1953.
DLC, TH1.C84, v. 66

Daily observations of snow-depth from 1941-1951 were recorded to determine variations in average conditions throughout Canada. The dates of first and last snow cover, duration of cover, yearly maximum depth, and the monthly average and greatest 24-hr. snowfall are tabulated for 11 major cities. Isolines of snow depth at 10-in. intervals and of the average duration of a snow cover 1 in. or more deep at 10-day intervals are mapped.

SIP U6645

TRUCKS IN SNOW REMOVAL. Eng. and Contract Record, 66, No. 10:96, 98, 100 incl. illus. Oct. 1953.
DLC, TH1.C84, v. 66

Factors common to all methods and techniques of snow removal by trucks are presented. The weight of the truck, body and ballast should not exceed the gross vehicle rating of the truck. All the weight of the plow should rest on the plow shoes. About 66% of the rated capacity of the truck should be carried as ballast located to give equal weight on all 4 wheels. The use of single tires especially on the back wheels is recommended. The appropriate use of one-way, V-type and rotary plows is discussed. Typical plowing methods are described.

SIP U6646

NEW BRUNSWICK TESTING "ICE-FREE" PAVEMENT. Eng. and Contract Record, 66, No. 10:100 incl. illus. Oct. 1953.
DLC, TH1.C84, v. 66

An 800-ft. strip of special ice-free pavement laid on the Trans-Canada highway between Jemseg and Young's Cove (N. B.) will be winter-tested in 1953-54. The 1.25-in. thick pavement is superimposed on 3 in. of asphaltic base underlain by a minimum of 18 in. of gravel subbase. The pavement is treated with an undisclosed ice-repellant mixture representing about 2% of its total weight. It is claimed that the repellent was used successfully in Nazi Germany. (See also SIP U5124)

SIP U6647

Deeley, R. M.
STRUCTURE OF GLACIER ICE. Geol. Mag. 4:529-531, illus. Dec. 1907. 4 refs.
DLC, QE1.G15, v. 4

Copies of ridges and furrows on ice-cave surfaces were obtained by placing paper on the ice surface and rubbing with a pencil. The glacier structure thus shown results from the slow melting and evaporation of the ice surface. It is believed that the irregularities in the striations on the ice rubbings indicate the direction of the optic axis.

SIP U6648

Shutt, Frank T. and B. Hedley
THE NITROGEN COMPOUNDS IN RAIN AND SNOW. Proc. Trans. Roy. Soc. Can. 3d Ser. 19, Sect. 3:1-10 incl. tables, 1925. 4 refs.
DLC, AS42.R6, v. 19

The amount of N present as free NH_3, albuminoid NH_3, NO_3, and NO_2 was determined for every fall of rain and snow yielding a sufficient catchment for analysis from 1907-1924 at the experimental farm near Ottawa. No direct relation exists between the volume of the precipitation and the amount of N/acre, because the concentration of N compounds in precipitation is a variable factor. The average N content and the amounts and proportion of N in snow and rain are tabulated. The total N content of snow is practically half that of rain. The average yearly amount of N contributed by snow and rain is equivalent to that produced by 44 lb./$NaNO_3$. Snow contributes about 17% of the total. (See also SIP U6631)

SIP U6649

Barnes, Howard T.
TEMPERATURE RECORDS OF NOCTURNAL RADIATION. Proc. Trans. Roy. Soc. Can. 2d Ser. 12, Sect. 3:127-139 incl. graphs, diagrs. 1906. 4 refs.
DLC, AS42.R6, v. 12

Two thermometers connected differentially were placed side by side in boxes with hinged covers. One thermometer was covered; the other was exposed to night radiation. The magnitude of night radiation and its variation with the degree of cloudiness was observed. The screening effect of glass, saturated salt solutions, mica plate, and 2- and 4-in. thick clear ice was studied. Ice, 4 in. thick, at an air temperature of 28°F cuts the radiation to about one-half of its previous value.

SIP U6650

Barnes, H. T. and H. M. Mackay
CRUSHING STRENGTH OF ICE. Trans. Roy. Soc. Can. 3d Ser. 9, Sect. 3:87-92 incl. diagrs. 1915.
DLC, AS42.R6, v. 9

The crushing strength of ice varies with its physical condition. The strength is likely to be less in larger blocks than in small ones owing to a greater probability of faults. A crushing strength of 376 lb./sq. in. was obtained for a faultless block 18 x 12 x 14.5 in. (See also SIP U1071)

SIP U6651

Peppler, Albert and Fritz Hummel
THE MEAN AND MAXIMUM SNOW DEPTHS IN SCANDINAVIA, FINLAND AND IN THE EAST BALTIC AREA. (Die mittleren und maximalen Schneehöhen in Skandinavien, Finnland und im ostbaltischen Gebiet; Text in German). Petermanns Geographische Mitt. 80:73-76, 110-113 incl. tables, maps, 1934. 9 refs.
DLC, G1.P43, v. 80

The mean and maximum snow depths of Norway, Sweden, Finland, Estonia, Lithuania, and Latvia are tabulated, and isolines of mean depths are mapped. The data were obtained from observations by various stations in each country, for periods ranging from 1891-1930. All snow-depth means were derived by dividing the sum of snow depths by the number of days in the period. The snow conditions in the various regions are individually discussed.

SIP U6652

Wüst, Georg
NEW VIEWS ON ICEBERGS. (Neue Anschauungen über Eisberge; Text in German). Petermanns Geographische Mitt. 80:176 incl. table, 1934. 6 refs.
DLC, G1.P43, v. 80

Calculations of the ratio of visible to submerged portions of icebergs on the basis of specific weights alone are found erroneous. The ratio is a function of specific weight, iceberg form, and air content of the ice. Direct measurements of arctic icebergs of various forms show that the average ratio is 1:3, a value which is considered as an applicable approximation for arctic icebergs. The method of detecting icebergs by measuring the water temperature is rejected.

SIP U6653

Giaever, John
MAUDHEIM. TWO YEARS IN THE ANTARCTIC. (Maudheim. To år i Antarktis; Text in Norwegian). Oslo, Gyldendal, 1952, 373p. incl. illus. maps, diagrs.
DLC, G850 1949.G5, 1952

The life and experiences of the members of the 1949-52 Norwegian-British-Swedish scientific expedition are reviewed. Some preliminary data are given to illustrate data collection. The height of the inland ice previously measured at 4200 m. above sea level by a German was proved incorrect. The preliminary profile of 600 km. from station Maudheim toward the high plateau of the inland ice was about 3000 m. above sea level. New profiles of land are shown on maps and photographs.

SIP U6654

Budtolaev, N.
SOME CONSTRUCTION PROBLEMS IN THE ARCTIC. (Nekotorye voprosy stroitel'stva v Arktike; Text in Russian). Sovetskaia Arktika, 7, No. 3:64-69 incl. illus. diagrs. 1941.
DLC, G600.S6, v. 7

Hydrotechnical constructions in the arctic requiring long range ice and permafrost data are discussed. Mooring and crib foundations are built on anvil blocks with footings in permafrost or on piles driven into the ground with the aid of steam needles determined by the type of ground and thickness of the active layer. An Igarka crib pier on a stable pile foundation backed by wedge-like fills showed no change after 6 yr. The use of prefabricated buildings in the arctic is also described.

SIP U6655

Shipchinskiĭ, A. V.
CLIMATE. (Klimat). p.18-27 incl. tables. (In: Voronezhskiĭ Kraĭ, Voronezh, 1928). 10 refs.
DLC, DK511.V9V6, 1928

The climatic characteristics of the Voronezh province based on long period data of observations is given. The snow cover during 1911-1923 appeared earliest in the beginning of Oct. and latest near the end of Dec. A stable snow cover usually appeared between Nov. 29 (northeast)-Dec. 17 (southwest) and reached a maximum depth of 24 cm. (southeast) -33 cm. (northwest) in Feb. Snow disappeared during Feb.-April. The average duration of the snow cover was 101-105 days in the south, and 121-125 days in the north.

SIP U6656

Sander, Adolf and Gerhard Damköhler
SUPERSATURATION DURING SPONTANEOUS NUCLEI FORMATION IN WATER VAPOR. (Übersättigung bei der spontanen Keimbildung in Wasserdampf; Text in German). Naturwissenschaften, 31: 460-465 incl. graphs, diagrs. Sept. 24, 1943. 6 refs.
DLC, Q3.N7, v. 31

The existence of spontaneously formed condensation nuclei as liquid particles or as ice crystals at low temperatures was investigated. The supersaturation of water vapor necessary for spontaneous nucleation was measured between 35° to -75°C. Results show that a sudden change in the spontaneous nuclei formation process occurs at -62°C, and the condensation particles glitter. The glittering is attributed to the appearance of ice particles.

SIP U6657

Whitnah, Gordon R. and Millard H. LaJoy
HEATING ARCTIC BUILDINGS. Heating, Piping Air Conditioning, 25, No. 10:96-99 incl. tables, map, Oct. 1953.
DLC, TH7201.H45, v. 25

Design data for heating systems in arctic installations are given. Data given for 15 locations in Alaska include information on soil types, frost depths, design snow loads and degree day accumulations. Some form of panel heating is needed in the passive method of construction on permafrost to offset uncomfortably cold floors. Insulation of clothing and comfort measures are discussed.

SIP U6658

Glavnoe Upravlenie General'nogo Shtaba
FAR EAST. (Dal'niĭ Vostok; Text in Russian). St. Petersburg, 1911, vol. 1 suppl. pt. 2, 232p. incl. tables. 11 refs.
DLC, DK752.A5, 1911

The navigation conditions on the main rivers in the Far East are described. Data on mean and extreme dates of river freezing and opening, and duration of the ice cover are presented for periods up to 40 yr. The rivers of the Far East are usually under an ice cover from Nov.-March. The earliest dates of freeze-up occurred in Oct. and the latest dates of breakup in May. The Amur River near Khabarovsk was usually unnavigable for 139-167 days and near Nikolaevsk for 174-207 days.

SIP U6659

Koloskov, P. I.
INTERRELATIONS BETWEEN THE SOIL AND AIR TEMPERATURES IN PERMAFROST REGIONS AS AN INDEX FOR POTENTIAL FARMING. (Otnoshenie temperatury pochvy k temperature vozdukha v oblasti vechnoĭ merzloty kak pokazatel' selskokhozĭaĭstvennykh i klimaticheskikh potentsial'nykh vozmozhnosteĭ; Text in Russian). Trudy komissii po izucheniĭu vechnoĭ merzloty, 1:77-87 incl. tables, graph, map, 1932. 3 refs.
DLC, S599.R9A7, v. 1

The upper 20 cm. of the active layer are subjected to wide fluctuations in temperature. Soil and corresponding air temperatures in several permafrost regions are tabulated for 5 to 10-yr. periods. The temperature of the active layer in taiga permafrost regions increases in changing from virgin to cultural soil. Instructions are given for obtaining more information on air and soil temperature relationships in view of farming possibilities in permafrost regions.

SIP U6660

Dranitsyn, D. A.
SOME ZONAL FORMS OF THE RELIEF OF THE FAR NORTH. (O nekotorykh zonal'nykh formakh rel'efa kraĭnĭago severa; Text in Russian and French). Pochvovedenie, 16, No. 4:21-32 incl. illus. diagrs. 1914. [30] refs.
DA, 57.8 P34, v. 16

Zoning of relief forms in the Far North can be observed through the study of the distribution of fauna, flora, weathering products, structural soil and other permafrost phenomena. Various tundra zones are

characterized by peat mounds partly covered by vegetation which are 3-6 m. high and 10 m. wide. The convex denuded tops of mounds are inclined toward the southwest and are covered by shallow cracks forming polygons. Vegetation grows on the wider fissures. Sludge enclosed in frozen layers is subjected to pressure and is forced to the surface as small volcanoes or remains in the freezing soil, and deforms the surface. Free water in taliks has a similar effect. A theory of frost mound formation based on that of Nikiforov is presented.

SIP U6661

Pardé, Maurice
THE ROLE OF SNOW IN FLOODS. (Role de la neige dans les crues; Text in French). Rev. l'étude calamités, 5, No. 16-17:26-36, Jan.-June 1942. 2 refs.
DLC, HV553.R4, v. 5

Snow contributes 15-20% to the water volume of floods, and only rarely induces a dangerous high-water condition. Snow prevents high-water levels by retaining much rain water in mountains.

SIP U6662

Hess, E.
CONSTRUCTION OF DEFENSES AGAINST AVALANCHES IN SWITZERLAND. (Les travaux de défense contre les avalanches en Suisse; Text in French). Rev. l'étude calamités, 5, No. 16-17:74-78, Jan.-June 1942. 1 ref.
DLC, HV553.R4, v. 5

Avalanche defensive measures consist of snow retention by means of walls or terraces, or the artificial release of unstable snow covers by means of mortars. Caution must be exercised in releasing avalanches to prevent the simultaneous release of avalanches in neighboring areas.

SIP U6663

Glen, J. W.
RATE OF FLOW OF POLYCRYSTALLINE ICE. Nature, 172:721-722 incl. graph, Oct. 17, 1953. (Letters to the editors). 1 ref.
DLC, Q1.N2, v. 172

Compression tests on polycrystalline ice blocks were made at -12.8°, -6.7°, -1.5° and -0.02°C. Creep curves were obtained at all the testing temperatures, and the tests at various stresses and temperatures are compared. The log of the minimum rate of strain observed in each test is plotted against the log of the compressive stress applied to produce it. The points for any given temperature lie reasonably close to a straight line. An equation relating the rate of strain at any given stress as a function of temperature is given. The true quasi-viscous creep rate was calculated and found to move the points at the lower stresses to lower rates of strain. It is emphasized that the relations obtained are not necessarily exactly those occurring in glaciers. (See also SIP U5152)

SIP U6664

Harding, J. B.
OBSERVATION OF COSMIC RAY EVENTS IN NUCLEAR EMULSIONS EXPOSED IN A GLACIER AT 3550 M. Phil. Mag. 42:651-662 incl. table, graphs, June 1951. 11 refs.
DLC, Q1.P5, v. 42

Previous experiments on the absorption of the star producing radiation and the variation of the number of π^--mesons with depth in ice were repeated to improve statistics and geometry. The variation in the numbers of slow μ-mesons with depth is in fair agreement with a predicted variation. The best estimate for the absorption mean free path of the star producing radiation is 170 ± 10 gm./sq. cm. The variation of the numbers of π^+-mesons with depth is consistent with an absorption path length for nuclear interaction corresponding to a few times the geometric value. A large upward stream of π^--mesons was observed and possible interpretations are discussed. (See also SIP U6557 and U6260)

SIP U6665

Keidel, Juan
PENITENT SNOW OF THE ARGENTINE ANDES. (Sobre la nieve penitente de los Andes Argentinos; Text in Spanish). República Argentina. Anales del Ministerio de Agricultura de la Nación, Sección Geología, Mineralogía y Minería, 12, No. 4:7-84 incl. illus. diagrs. 1918. 59 refs.
DLC, GB2459.K5, v. 12

The distinct phases in the evolution of penitent snow are described, and the general characteristics are discussed. An analysis is made of the relationships between the climatic conditions of the zone of penitent snow and the processes of penitent-snow formation. The probable role of solar radiation in the formation of penitent snow, and the morphological differences between penitent snow in the Argentine Andes and that of mountains of the intertropical zone are indicated.

SIP U6666

Baertschi, Peter
THE RELATIVE DIFFERENCES IN THE $H_2{}^{18}O$-CONTENT OF NATURAL WATERS. (Über die relativen Unterschiede im $H_2{}^{18}O$-Gehalt natürlicher Wässer; Text in German). Helv. Chim. Acta, 36: 1352-1360 incl. tables, Oct. 15, 1953. 39 refs.
DLC, QD1.H4, v. 36

The relative differences in the $^{18}O/^{16}O$-ratio of 91 waters of natural origin as compared with Basel (Switzerland) tap water were measured by means of a mass spectrometer, and indicated in p.p.m. of the $^{18}O/^{16}O$-ratio in standard water. A simple

method of isotope analysis is described. The deviation of snow from the $^{18}O/^{16}O$-ratio (or ^{18}O-content) of the standard water was -6.8 p.p.m. Meltwater from glacier ice is marked by a specially low ^{18}O-content.

SIP U6667

Scultetus, H. R.
THE OBSERVATIONS OF GROUND TEMPERATURES IN THE OBSERVATION NETWORK OF THE PRUSSIAN METEOROLOGICAL INSTITUTE DURING THE YEARS 1912 TO 1927. (Die Beobachtungen der Erdbodentemperaturen im Beobachtungsnetze des Preussischen Meteorologischen Instituts Während der Jahre 1912 bis 1927; Text in German). Veröffentl. Preuss. Meteorologischen Inst. Abhandl. 9:1-44 incl. tables, graphs, diagr. 1930. 16 refs.
DLC, QC989.G255, v. 9, No. 5

Ground temperature measurements at depths of 10, 20, 50, and 100 cm. using Hg thermometers at 13 stations are discussed. Mean monthly and annual air and ground temperatures, long period means, and monthly extremes are tabulated. Frost penetration depths with accompanying meteorological conditions for each year are discussed, including the snow-cover effect.

SIP U6668

Peppler, W.
RIME AND ICE FORMATION IN THE FREE ATMOSPHERE. (Reif- und Eisbildung in der freien Atmosphäre; Text in German). Beitr. Phys. frei. Atmosphäre, 10:38-50 incl. tables, Oct. 31, 1921. 8 refs.
DLC, QC851.B4, v. 10

A study is made of the meteorological and aerological conditions responsible for the formation of rime and ice on objects. The work is based on kite ascents made from 1909-1916 during which ice or rime deposits were observed on the wires or kite body. Cloud type, amount and density, and precipitation observed during the ascents with rime and ice formation are tabulated. The aerological conditions tabulated include frequency of different temperatures at the lower cloud limit, mean temperature of the lower cloud limit for different cloud types, and distribution of maximum temperatures in inversion layers. The rime deposits form at cloud temperatures which are usually several degrees below 0°C, and the clouds consist of supercooled fogs rather than ice crystals. Precipitation in the form of air hoar, an intermediate deposit (Rauhfrost), or rime depends on the magnitude of the supercooled droplets.

SIP U6669

Schmauss, A.
ICE — A HYGROSCOPIC SUBSTANCE. (Eis — eine hygroskopische Substanz; Text in German). Z. angew. Meteorologie, 57:25-26, Jan. 1941.
DWB, P Z48a, v. 57

Ice is compared with drying agents such as $CaCl_2$ or P_2O_5 and it is shown that ice crystals are effective hygroscopic substances. The drying agents have an initially large absorptivity which rapidly recedes due to the formation of a diluted solution at the surface. Ice retains its absorptive property and increases it due to the rapid increase in surface area and crystallization forces.

SIP U6670

Wall, E.
RECENT RESULTS OF SNOW RESEARCH. (Über neuere Ergebnisse der Schneeforschung; Text in German). Z. angew. Meteorologie, 57:69-77 incl. tables, diagrs. March 1941. 12 refs.
DWB, P Z48a, v. 57

The most important results of Nakaya's investigations on snow are discussed. Included are the artificial production of snow crystals and the snow-crystal classification.

SIP U6671

Kreutz, W.
A CONTRIBUTION TO THE STUDY OF RIME. (Ein Beitrag zum Nebelfroststudium; Text in German). Z. angew. Meteorologie, 58:137-150 incl. illus. tables, graphs, May 1941. 1 ref.
DWB, P Z48a, v. 58

Studies were made at an elevation of 800 m. to determine the dependency of rime on the material, form, and surface condition of the receptacles. Plates, 10 cm. square, 1 mm. thick, and rods, 20 cm. long and 1 cm. in diam. were erected 1.5 m. above the ground with their front exposed to the wind at all times. The plates and rods consisted of Cu, brass, Al, Fe, wood and glass. Three samples of each type were untreated, coated with a varnish, and coated with acid-free vaseline. A circular Al plate and 2 equally heavy poles of deciduous and coniferous wood were also erected. The amount of deposit was measured by melting and volume determination of the meltwater after each deposition. The deposits are classified into air hoar, an intermediate deposit (Rauhfrost) and rime. Results show that the deposits were smallest on untreated brass surfaces, and largest on the vaseline-coated wood surfaces. Air hoar on the plates contributed the least average amounts, and rime on the rods the greatest. Greater deposits formed on the coniferous wood.

SIP U6672

Wall, E.
THE STATE OF SUPERCOOLED CLOUDS. (Über den Zustand unterkühlter Wolken; Text in German). Z. angew. Meteorologie, 58:281-284, Sept. 1941. 1 ref.
DWB, P Z48a, v. 58

A light snowfall was regularly observed after a supercooled water cloud began to dissolve due to solar radiation following several hours of stable conditions.

The precipitating snow particles were snow skeletons and more basic forms at temperatures near -15°C when the supercooled cloud was still dense. The crystals constantly decreased in size and became prismatic as the cloud disappeared. An ice fog with halo, parhelion, and lower parhelion formed after the complete disappearance of the cloud. It is suggested that the dissolution of the water cloud might be a prerequisite for the formation of the ice cloud. It is concluded that the simultaneous existence of water droplets and ice particles in supercooled clouds does not indicate the presence of an average vapor pressure.

SIP U6673

Kreutz, W.
PROTECTIVE EFFECT OF THE SNOW COVER. (Schutzwirkung der Schneedecke; Text in German). Z. angew. Meteorologie, 58:305-314 incl. table, graphs, Oct. 1941.
DWB, P Z48a, v. 58

The temperature distribution in a northerly snow profile was measured with standard thermometers every 2 hr. at suitable intervals from Jan. 21-Feb. 2 and from Jan. 26-Feb. 2. The snow temperatures at depths of 5, 10, 30, 50, 70, 90 and 100 cm. are plotted, and the isotherms in snow and ground which were calculated from the measured temperatures by graphic interpolation are indicated. Air, snow and ground temperatures (10, 20, 50, 100 cm.) are compared, and the course of temperatures in humus and sandy soils with and without snow cover is plotted. A temperature difference of 12°C was measured between the air temperature and the snow temperature at a depth of 100 cm. The mean penetration speed of the snow isotherms was about 25 cm./day. Temperature measurements at the ground surface with and without snow cover indicate the direct influence of soil type on snow temperature.

SIP U6674

Wilson, James T.
THEORY OF THERMAL ICE-PUSH. 7p. incl. illus. diagrs. Dec. 1952. (In: Detailed Study of Ice on an Inland Lake. Interim Rept. Eng. Res. Inst. April 1953).(Contract DA-11-190-Eng. 2)
SIPRE files

The theory of thermal ice push is based on the vertical temperature gradient in a floating ice sheet. The lower surface of the ice sheet is at the f.p. and the upper surface is at a lower temperature during cold weather. The sheet becomes convex upward as the upper surface warms. A sheet weak in transverse loading will break into segments exerting a push on the shore. The needed temperature rise to break the ice sheet, the size of the ice segments, and the maximum push are calculated. The temperature rise is proportional to the strength and independent of the ice thickness. The size of the segments increases with the ice thickness. The values obtained agree with those observed on Wamplers Lake (Mich.) in 1951-52.

SIP U6675

Marshall, E. W.
TEXTURE OF LAKE ICE. 3p. illus. graphs, Aug. 1952. (In: Detailed Study of Ice on an Inland Lake. Interim Rept. Eng. Res. Inst. April 1953).(Contract DA-11-190-Eng. 2)
SIPRE files

Two basic structures were observed in the ice of Wamplers Lake (Mich.). Fine, crystalline, granular aggregates are produced by heavy snowfall during freeze-up or by wet and dry snow metamorphism on the ice surface. Coarse, crystalline, columnar aggregates produced by normal ice-sheet accretion range in size from a fraction of an in. to several in. in diam. and with length comparable to the thickness of the ice sheet. Crystal size distribution data compiled from rubbings are presented in histogram form. There is a normal distribution pattern at both top and bottom with a shift toward larger and fewer crystals with depth.

SIP U6676

Dewar, James
COEFFICIENTS OF THE CUBICAL EXPANSION OF ICE, HYDRATED SALTS, SOLID CARBONIC ACID, AND OTHER SUBSTANCES AT LOW TEMPERATURES. Proc. Roy. Soc. (London), 70:237-246 incl. tables, July 8, 1902. 8 refs.
DLC, Q41.L7, v. 70

The density of pieces of clear ice was determined as 0.92999 at -188.7°C and 0.91595 at 0°C. The mean coefficient of expansion of ice between 0° and -188.7°C was calculated as 0.00008099. This is about 0.5 of the mean coefficient of expansion of ice between 0° and -20°C and of water between 4° and 100°C, and 0.25 of the mean coefficient of expansion of water between 0° and -10°C. There is no distinction between the solid and liquid forms of water at -122.8°C under 16,632 atm. pressure. No amount of pressure will transform ice into water at temperatures below -122.8°C.

SIP U6677

Tomkinson, E.
THE COLOUR AND MOLECULAR FORMULA OF WATER AND ICE. Chem. News, 122:205-208 incl. diagr. May 6, 1921. [20] refs.
DLC, QD1.C5, v. 122

Four theories to explain the color of H_2O and ice are advanced by different authors: (1) the blue color of pure H_2O and ice is due to selective absorption of rays of complementary color, perhaps due to molecular aggregation; (2) the color is due to the scattering of light by suspended particles; (3) the color is due to a sky effect; (4) the color of sea water is due to dissolved organic matter. It is believed that (1) and (4) explain all the observed facts.

SIP U6678

Le Bas, Gervaise
WATER AND ICE. Chem. News, 122:249-250 incl. diagrs. May 27, 1921. (Correspondence)
DLC, QD1.C5, v. 122

Molecular refractions do not provide information on the degree of complexity of water molecules, since the conditions for water resemble those for molecular associations and not combinations. It is probable that the O molecules are separated from each other by a shell of dielectric, and the valencies are activated, but not united. (See also SIP U6677)

SIP U6679

Barkow, E.
THE RESULTS OF THE METEOROLOGICAL OBSERVATIONS OF THE GERMAN ANTARCTIC EXPEDITION 1911-1912. (Die Ergebnisse der meteorologischen Beobachtungen der Deutschen Antarktischen Expedition 1911-1912; Text in German). Veröffentl. Preuss. Meteorologischen Inst. Abhandl. 7:1-166 incl. tables, graphs, map, diagrs. 1924. [15] refs.
DLC, QC989.G255, v. 7, No. 6

The meteorological observations made from the departure of the Deutschland to the arrival in South Georgia are presented. Included are the results of observations of atmospheric pressure, air temperature, humidity, wind, cloudiness, sunshine duration, precipitation, ice temperatures, and the upper atmosphere. Snow depths were measured regularly with gages, and snow densities obtained by melting a known volume of snow. A mean density of 0.317 was obtained from 10 measurements in fresh snow dunes in July, 0.263 in Aug. and 0.225 in Sept. The density variation is attributed to the variation in the size and shape of the snow crystals. A discussion of ice-temperature variations with depth is included.

SIP U6680

Knoch, K.
E. BARKOW'S RESULTS OF THE METEOROLOGICAL OBSERVATIONS BY THE GERMAN ANTARCTIC EXPEDITION 1911 TO 1912. (E. Barkows Ergebnisse der meteorologischen Beobachtungen der Deutschen Antarktischen Expedition 1911 bis 1912; Text in German). Z. Ges. Erdkunde Berlin, No. 1-2: 50-61 incl. tables, 1927. 5 refs.
DLC, G13.G5, 1927

Results of investigations of atmospheric pressure, air temperature, vapor pressure, relative humidity, wind speed, cloudiness, sunshine, precipitation, and ice temperatures are summarized. Electrical resistance thermometers were used to measure ice temperatures at depths of 2, 5, 10, 20, 30, and 50 cm. The absolute ice temperature variation decreases by one half from 2-20 cm. (See also SIP U6679)

SIP U6681

Plyler, E. K.
SOME PROPERTIES OF ICE CRYSTALS. J. Elisha Mitchell Sci. Soc. 41:18, Sept. 1925. (Abstract)
DLC, Q11.E4, v. 41

The theory of Chamberlain is not applicable to a solid piece of ice. The region between the ice crystals has a much higher absorption of infrared light than the ice itself. Melting first occurs between the crystals when light is incident upon the ice. The thickness of the boundary between the individual crystals was found to be less than 0.0008 cm. in many cases. Large ice crystals have greater heat capacity and lower vapor pressure over them than small crystals.

SIP U6682

Errera, J.
THE SOLID STATE AS VIEWED FROM THE ELECTRICAL VIEWPOINT: DISPERSION IN THE HERTZIAN DOMAIN. (L'état solide envisagé du point de vue électrique: dispersion dans le domaine hertzien; Text in French). Bull. soc. chim. Belg. 34:35-38 incl. graph, Jan. 1925. 4 refs.
DLC, QD1.S35, v. 34

Solids give marked dispersion effects as shown by the large variation of the dielectric constant with the frequency of the current used at temperatures approaching their m.p. Ice at -200°C has a dielectric constant of 2-3 for all wave lengths; at -22°C between O and 600 km. wave lengths the constant increases from 2-40, at -2°C it increases from 2-73 between O and 250 km. The close relationship between the dielectric constant for the liquid and the solid states at low frequencies indicates a similarity of molecular arrangement in both states.

SIP U6683

Sumgin, Michail
PERMAFROST. (Über die ewige Gefrornis des Bodens; Text in German). Z. Ges. Erdkunde Berlin, No. 1-2:27-32 incl. table, 1929. 1 ref.
DLC, G13.G5, 1929

Shostakovitch's method of determining the presence or absence of permafrost and the degree of development on the basis of the ratio between mean air temperature (Dec.-Feb.) and snow-cover depth in Jan. is criticized. The unreliability of the coefficients is indicated since long-period means were not used in calculating them. The type of local vegetation, soil character, and degree of moisture are factors which must also be considered in addition to snow depth and air temperature. Permafrost is assumed to be the product of an earlier epoch, rather than that of the present climate as advanced by Shostakovich. The spring and summer regime of rivers in permafrost areas would remain unchanged if permafrost were absent according to Sumgin. (See also SIP U6635)

SIP U6684

Rolf, Bruno
NOTE ON THE CONDENSATION AND EVAPORATION OCCURRING AT THE SURFACE OF A SNOW COVER. (Note sur la condensation et l'évaporation qui se produisent à la surface d'une couche de neige; Text in French). Arkiv. Mat. Astron. Fysik, 9, No. 35:1-19 incl. tables, July 2, 1914. 8 refs.
DLC, Q64.S874, v. 9

White-painted zinc pans filled with snow were weighed and wedged in the snow cover. The snow-filled pans were weighed again after exposures varying from 2-24 hr. The increase or decrease in weight is tabulated and the results are discussed. Formulas are derived determining condensation and evaporation during winter, spring, and summer. The calculated amounts of winter evaporation and condensation for definite differences between snow cover and air temperature are tabulated.

SIP U6685

Maass, O. and L. J. Waldbauer
THE SPECIFIC HEATS AND LATENT HEATS OF FUSION OF ICE AND OF SEVERAL ORGANIC COMPOUNDS. J. Am. Chem. Soc. 47:1-9 incl. tables, graphs, Jan. 1925. 9 refs.
DLC, QD1.A5, v. 47

A method for measuring specific and latent heats of fusion at temperatures from 16.5° to -183.6°C is described. The specific heats of ice, benzene, CH_3OH and $(CH_3)_2CO$, and the average specific heats and the latent heats of other substances were determined. The calculated specific heats of ice from 0° to -180°C ranged from 0.485-0.144 and are compared with those obtained by Dickinson and Osborne, and Nernst. The latent heat of fusion of ice was found to be 79.42 cal.

SIP U6686

Ångström, Anders
THE INFLUENCE OF THE GROUND SURFACE ON ILLUMINATION. (Der Einfluss der Bodenoberfläche auf das Lichtklima; Text in German). Gerlands Beitr. Geophys. 34:123-130, 1931. 3 refs.
DLC, QC801.B3, v. 34

Reflected light under any condition of the atmosphere does not increase illumination more than 8% with snow-free ground cover. Snow-covered ground with a clear sky increases illumination 20% and for an overcast sky over 100%.

SIP U6687

Knight, Nicholas
SUBSTANCES IN RAIN AND SNOW. Proc. Iowa Acad. Sci. 31:325-326, 1924.
DLC, Q11.I5, v. 31

Twelve samples of snow and 29 of rain were collected and analyzed from Oct. 1, 1922-June 1, 1923 at Mount Vernon (Iowa). There were 70 in. of snow and 11.2 in. of rain. The aggregate of the precipitations contained 20.35 lb. of Cl, 0.57 lb. of SO_3, and 3.93 lb. of N per acre. Only traces of phosphates were found.

SIP U6688

Foote, H. W. and Geneva Leopold
FREEZING POINTS. Am. J. Sci. 211:42-46, Jan. 1926. 12 refs.
DLC, Q1.A5, v. 211

The effect of dissolved air on the f.p. of compounds and solutions is discussed. It is suggested to define the f.p. as the temperature at which a solid and liquid are at equilibrium when saturated with dry air at 1 atm. pressure. This new definition of the f.p. shifts the triple point of water from 0.0075°C to 0.0098°C.

SIP U6689

Allan, J. A.
ICE CRYSTAL MARKINGS. Am. J. Sci. 211:494-500 incl. illus. June 1926. 3 refs.
DLC, Q1.A5, v. 211

Experiments were conducted to obtain ice crystal markings similar to those found in upper cretaceous sediments. Shallow pans were filled with 0.5 -3 in. of sand. The sand was saturated with water and left overnight in a snowbank at air temperatures varying from -10° to -30°F. Satisfactory ice crystals were obtained when the sand was completely saturated at freezing time. A 1-in. layer of liquid plaster of Paris was poured over the surface of the frozen mud. The plaster impressions were dried and photographed.

SIP U6690

Murphy, John
THE ICE QUESTION—AS IT AFFECTS CANADIAN WATER POWERS—WITH SPECIAL REFERENCE TO FRAZIL AND ANCHOR ICE. Proc. Trans. Roy. Soc. Can. 3d ser. 3, sec. 3:143-177 incl. illus. graphs, map, diagrs. 1909.
DLC, AS42.R6, v. 3

Anchor and frazil ice problems at Canadian power plants are discussed and methods for their solution outlined. Frazil ice troubles are never experienced when the sun is shining. Clogging of racks and water-wheel chutes by frazil ice is reduced or prevented by sun exposure, by keeping the vulnerable parts protected from cold air and by steam or electric heating. A slight increase of water temperature over 0°C near the racks or chutes has the most favorable effect.

SIP U6691

Cooke, H. Lester
THE VARIATION IN THE DENSITY OF ICE. Proc. Trans. Roy. Soc. Can. 2d ser. 8, sec. 3:127-134 incl. table, diagrs. May 1902. 5 refs.
DLC, AS42.R6, v. 8

The apparent discrepancy of ice density determinations made by different investigators is explained. Ice specimens may be natural or artificial of interior, exterior or column formation. The density is normal when ice is free from internal strains. The density of ice varies toward a stable value as ice gradually recovers from internal strains set up during formation. A value of 0.91661 ± 0.000065 is given for St. Lawrence ice. The ice was cut from the lower surface of the ice sheet. The specimens ranged from 1 mo.-2 yr. in age and had lost all variations due to age.

SIP U6692

Barnes, H. T.
PRODUCTION OF RING ICE OR HOAR FROST IN PIPES. Proc. Trans. Roy. Soc. Can. 3d ser. 10, sec. 3:93-96 incl. illus. table, Dec. 1916.
DLC, AS42.R6, v. 10

Ring ice forms in pipes of dry pipe spinkler systems in cold storage rooms. Ice forms slowly as hoarfrost on the inside of pipes exposed to the coldest temperature until a small hole is left through the interior. The water sources are moist air introduced by pumping, evaporation and freezing of water left in the pipes, and water vapor from priming the valve at the valve house. A table indicates the amount of water required to fill 1-ft. lengths of various sized pipes with ring ice. Ring ice does not subject pipes to strain as does ordinary freezing.

SIP U6693

Dauvillier, A.
STRANGE SOUNDS FROM INLAND ICE, GREENLAND. Nature, 133:836, June 2, 1934. (Letters to the editor)
DLC, Q1.N2, v. 133

A sound resembling the roaring of a fog-horn was heard 4 times during Aug. 1932 in Scoresby Sound. The sound appeared to come from the part of the coast where the inland ice flows into the sea from the large glaciers. Wegener attributed the sound to the movement of inland ice. It is suggested that it might be caused by the detachment of icebergs or by fields of powdery dry snow analogous to musical notes produced by sand in the desert.

SIP U6694

Blacktin, S. C.
PERIODIC STRUCTURE IN ICE. Nature, 133:613, April 21, 1934. (Letters to the editor). 1 ref.
DLC, Q1.N2, v. 133

A plano-convex ice lens had about 12 distinct colorless concentric circles, with transparent ice between the rings. The central ring had a radius of about 5 mm., and the radial variation was 0.5-1 mm. A small piece of black foreign matter was frozen concentrically.

SIP U6695

Ramakrishna Rao, I.
CONSTITUTION OF WATER IN DIFFERENT STATES. Nature, 132:480 incl. table, Sept. 23, 1933. 3 refs.
DLC, Q1.N2, v. 132

The relative proportions of the single, double and triple molecules of water in the different states were calculated from the intensities of the components in the Raman spectrum. The values obtained for ice were 0 (H_2O), 41 $(H_2O)_2$ and 59 $(H_2O)_3$. The maximum density of water at 4°C might be attributed to the existence of a maximum number of $(H_2O)_2$ molecules at this temperature, which are more compact than $(H_2O)_3$ molecules.

SIP U6696

Ramakrishna Rao, I.
RAMAN EFFECT FOR WATER IN DIFFERENT STATES. Phil. Mag. 17:1113-1134 incl. tables, diagrs. June 1934. [40] refs.
DLC, Q1.P5, v. 17

Raman spectra are compared with infrared spectra for water vapor, liquid water, ice and water of crystallization. The positions of the maxima for ice were determined from microphotometric records, and the wave lengths calculated. Ice showed only 2 components in the band with values of 3321 and 3196 $cm.^{-1}$ when excited by the 4047 line of the Hg arc. The changes in the Raman spectrum for the different states are attributed to the formation of new molecular aggregates such as double and triple molecules.

SIP U6697

Clusius, K.
TRANSFORMATIONS IN CONDENSED HYDROGEN SULFIDE. (Über Umwandlungen im kondensierten Schwefelwasserstoff; Text in German). Nach. Ges. Wiss. Göttingen. Math. physik. Klasse, Fachgruppe III, No. 32:171-177 incl. graph, 1933. 17 refs.
DLC, AS182.G822, 1933

Certain transformations in the crystal structure of solids take place that can be detected only by determining certain physical constants. These changes are caused by the rotation of the molecules in the crystal lattice and should be favored by spherical molecules. Theories advanced to explain these transformations are discussed. Ice shows no transformations in the course of its specific heat curve even though the water molecule is similar to that of H_2S. This fact points to the absence of free rotation of the water molecule in the lattice and is in accordance with the appearance of anomalous dispersion in ice at very long Hertzian wave lengths. Transformation at normal pressure does not occur in ice possibly because the transformation point coincides with the m.p. The high heat of fusion of ice tends to verify the foregoing assumption.

SIP U6698

Averkiev, M.
OBSERVATIONS OF SNOW COVER AND WINTER PRECIPITATION. (K voprosu o zimnikh nabliudeniiakh osadkov i snegovogo pokrova; Text in Russian). Meteorologicheskiĭ Vestnik, 38:115-120 incl: tables, diagr. 1928.
DLC, QC851.M5, v. 38

Measurement accuracy of solid precipitation forms was investigated for Nizhniĭ-Novgorod province. Data for 1922-1927 obtained from 28 stations indicated the dependence of the precipitation amount on station location. The meteorological station in Nizhniĭ Novgorod received half as much winter precipitation after its transfer from within the city to an open field. Large differences between gage measurements and those obtained from field determinations of snow cover depth and density were noted. It is suggested that direct field measurements be made at stations located in unprotected positions.

SIP U6699

Sumgin, M. I.
ON PERMAFROST. (O vechno-merzloĭ pochve; Text in Russian). Meteorologicheskiĭ Vestnik, 38:255-259 incl. table, 1928. 3 refs.
DLC, QC851.M5, v. 38

The conclusions of V. B. Shostakovich concerning the determination of permafrost distribution from interrelations between the sums of Dec.-Feb. air temperatures and the snow cover in Jan. were analyzed. Long-period data fail to verify the validity of this coefficient. The coefficient indicates the presence of permafrost in southern areas of the USSR where permafrost was never observed. (See also SIP U6635)

SIP U6700

Sumgin, M. I.
THE PRESENT STATE OF PERMAFROST STUDY. (Sovremennoe sostoianie izucheniia vechnoĭ merzloty; Text in Russian). Meteorologicheskiĭ Vestnik, 39:38-42, 1929. 1 ref.
DLC, QC851.M5, v. 39

Permafrost investigations, especially those by transport organizations, are briefly reviewed. The basic problems of permafrostology were neglected, such as the annual heat balance of frozen layers, variations in the depth of the 0°C isotherm and origin of permafrost. A permafrostological station near Yakutsk, Verkhoyansk, or the Far East could conduct investigations to solve these problems.

SIP U6701

Vize, V. IU.
ICE CONDITIONS IN THE EASTERN SIBERIAN SEA. (Sostoianie l'dov v Vostochno-Sibirskom more; Text in Russian). Meteorologicheskiĭ Vestnik, 39: 53, 1929. 1 ref.
DLC, QC851.M5, v. 39

Ice observations from 1906-1928 between the estuary of the Kolyma River and Bering Strait indicated a periodicity of the ice phenomena. Periods of heavy ice deterring navigation occurred every 4-5.5 yr. Similar intervals occurred for periods of favorable navigation conditions.

SIP U6702

Krasovskiĭ, A.
NEW FIELD INSTRUMENT FOR MEASUREMENT OF SNOW DENSITY. (Novyĭ pokhodnyĭ snegomer i rezul'taty ego ispytaniia; Text in Russian). Meteorologicheskiĭ Vestnik, 39:96-98 incl. tables, 1929. 3 refs.
DLC, QC851.M5, v. 5

The new densitometer suggested by B. P. Mul'tanovskiĭ is a modification of the model used for snow density measurement at meteorological stations. The Al cylinder of the new meter is 40 cm. long with a receiving surface of 100 sq. cm. The instrument weighs 1575 gm. as compared to 2287 gm. for the old model. Tests during the winter of 1927-28 showed no differences in accuracy between the new and old models.

SIP U6703

Vitkevich, V. I.
INSTRUMENT FOR STUDY OF SNOW COVER MOBILITY. (Pribor dlia izucheniia podvizhnosti snegovogo pokrova; Text in Russian). Meteorologicheskiĭ Vestnik, 39:136-137, 1929.
DLC, QC851.M5, v. 39

A portable, hand-operated blower with an attached anemometer is recommended for studying snow mobility. This device placed in or over the snow might separate snowflakes according to their structure and air speed. Horizontal metallic frames fastened together and placed in the snow are also suggested as a means for studying the vertical distribution of snow density.

SIP U6704

Bogdanovich, G.
NON-INSTRUMENTAL OBSERVATIONS OF VISIBILITY. (Ob izmereniiakh vidimosti nevooruzhennym glazom; Text in Russian). Meteorologicheskiĭ Vestnik, 39:141-156 incl. tables, graphs, 1929.
DLC, QC851.M5, v. 39

Visibility data obtained from observations near Leningrad during 1923-1927 are tabulated and discussed. Annual variations in mean visibility reached a maximum of 24.2 km. in July and a minimum of 16.4 km. in Feb. Lower winter visibilities are accounted for by the higher relative humidity. The correlation coefficient between visibility and relative humidity in winter equalled -0.62; between visibility and electrical gradient, -0.95. The influence of rain and snowfall on visibility is expressed as a logarithmic function of the fall intensity.

SIP U6705

Popov, E.
PRECIPITATION MEASUREMENTS IN THE ARCTIC. (Ob izmerenii osadkov v polярnykh usloviяkh; Text in Russian). Meteorologicheskiĭ Vestnik, 39: 157-164 incl. tables, 1929. 6 refs.
DLC, QC851.M5, v. 39

Frequent strong winds at the Polar Observatory at Novaya Zemlya made winter precipitation measurements difficult. Measurements made during the winter of 1926-27 showed that precipitation measurements with the standard gage equipped with a Nipher shield amounted to only one-half to one-third of that obtained in snow surveys. An increase in the Nipher shield diam. and height decreased the precipitation catch further. A gage 1 m. high and shielded with wooden fencing yielded higher measurements than considered correct. A snow density of 0.46 on an open slope compared to 0.26 in a wind-protected area demonstrates the compacting power of the wind.

SIP U6706

Shenrok, A.
THE PROBLEM OF MEASUREMENT OF SNOW PRECIPITATION. (K voprosu ob uchete snezhnykh osadkov; Text in Russian). Meteorologicheskiĭ Vestnik, 39:256-258, 1929. 3 refs.
DLC, QC851.M5, v. 39

Observations made by A. Skipskiĭ at Brasovo Experimental Station since 1926 showed that rain gages collected only 42-75% of snow precipitation measured by field observations of snow depth and density. These data as well as the investigations of E. Popov in the arctic and R. Geiger in Bavaria indicated the influence of wind velocity on the accuracy of measurement, especially in open places, where much snow is usually blown out of rain gages. Strong winds often lift snow from the surface and deposit it in the rain gage. Investigations in regions of strong wind on protected rain gage installations may solve this problem.

SIP U6707

McKinley, John L.
BUS TERMINAL SNOW-MELTING SYSTEM OF THE PORT OF NEW YORK AUTHORITY. Bull. Natl. District Heat. Assoc. 37:157-160 incl. illus. table, July 1952.
DLC, TH7201.N28, v. 37

The snow-melting coils consisting of 76 grids and 4 sinuous coils of 1.25-in. steel pipes spaced 20 in. on centers are in the upper sections of the ramps. The system is designed for an assumed density of snow of 7.8 lb./cu. ft. at 34°F and a rate of snowfall of 1 in./hr. Normal steam requirement is 9000 lb./hr. and the electrical power demand about 114 kw. The system, manually started and stopped, functions automatically after starting according to the temperature of the most exposed concrete slab on the ramp. Limit controls for a maximum rise of 10°F/hr. and a maximum ramp temperature of 44°F are described.

SIP U6708

Goetchius, Rachel
EXPERIENCE REPORT OF BIG SNOW MELTING SYSTEM. Skyscraper Management, 36, No. 9:8-9 incl. illus. Sept. 1951.
DLC, TH1.S5, v. 36

The problems and suggestions of the operators of the sidewalk, driveway, and ramp snow melting installation of the New England Telephone & Telegraph Co. in Boston are presented. The antifreeze causes a deposit difficult to clean out of the U-shaped tubes of the heat exchanger. Better results are obtained in the driveway and ramp where the pipes were laid in the concrete than in the sidewalks where they were laid in crushed stone under the concrete slab. The laterals should be placed 10-12 in. on center, instead of 18, for better snow-melting results. The thermostatic bulb control set should be located in the coldest slab to reduce the present 10-hr. time lag.

SIP U6709

Bogoslovskiĭ, P. A.
ICE REGIME OF PIPELINES OF HYDROELECTRIC STATIONS. (Ledovyĭ rezhim truboprovodov gidroelektricheskikh stanцiĭ; Text in Russian). Moscow-Leningrad, Gosenergoizdat, 1950, 155p. incl. tables, graphs, diagrs. 28 refs.
DLC, TK1081.B65, 1950

Conditions favorable for ice formation in water supply lines are analyzed. Methods of calculating the probable ice thickness within pipes are suggested. The thermal regime of water flowing in a pipe, its dependence on outer and inner factors, and measures for the prevention of ice damages are discussed. Special attention was paid to the problem of ice formation in water turbines.

SIP U6710

Gregory, J. W.
STONE POLYGONS BESIDE LOCH LOMOND. Geographical J. 76:415-418 illus. Nov. 1930. 10 refs.
DLC, G7.R91, v. 76

Closely packed, tilted stone groups, similar to arctic polygons were found on Loch Lomond in Scotland. Several explanations for the extensive development of stone-packing are reviewed. Stone rings are more frequent than the polygonal form. The groups consist only of stones without the central core of mud and very little fine sediment. Essential factors for stone-polygon formation are loose, wet sod containing flat pebbles, frequent freezing and thawing, horizontal pressure and soil movement modified by resisting obstacles. Pressure action of stranded melting ice blocks blown ashore, and the action of waves may also contribute to polygon formation.

SIP U6711

Evgenov, N. I.
EXPEDITION TO THE ESTUARIES OF THE LENA AND OLENEK RIVERS. (Ekspeditsiia k ust'iam rek Leny i Oleneka; Text in Russian with English summary). Trudy Komissii po Izucheniiu IAkutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 3, No. 1:1-205, 247-249 incl. illus. tables, graphs, diagrs. 1929. [20] refs.
DLC, DK771.Y2A17, v. 3

The results of meteorological and hydrographical observations of the expedition in 1920-21 are recorded. Permafrost was found at a depth of 10-70 cm. on the island of Sagastyr. Considerable snow accumulations were noted in otherwise snowless landscape. The region is characterized by ridge hillocks of fossil ice 2 m. thick and granular in structure.

SIP U6712

Evgenov, N. I.
NAVIGATION CONDITIONS IN THE DELTA OF THE LENA RIVER AND DESCRIPTION OF THE COURSE BY ITS BRANCHES. (Materialy po lotsii del'ty r. Leny i opisanie khoda po ee protokam; Text in Russian). Trudy Komissii po Izucheniiu IAkutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respublikoĭ, 3, No. 3:1-41 incl. tables, maps, 1928. 5 refs.
DLC, DK771.Y2A17, v. 3

Cartography and navigation data are given for the Lena river delta collected by the expedition during 1920-21. Low Jan. temperatures averaging -59.4°C and spring snowstorms characterize a severe climate which is influenced in summer by the thawing of sea ice. Many branches freeze solid. The river opens in mid-June and somewhat earlier in the southern part of the delta. Freezing begins in late Sept. Long-period data on temperature, cloudiness, precipitation and wind frequency are tabulated.

SIP U6713

Ratmanov, G.
ANCHOR ICE IN KRESTOVAYA BAY AT NOVAYA ZEMLYA. (Donnyĭ led v gube Krestovoĭ na Novoĭ Zemle; Text in Russian). Meteorologicheskiĭ Vestnik, 36:46, 1926. (Short notes and chronicles)
DLC, QC851.M5, v. 36

Anchor ice in the Arctic Ocean was observed on Nov. 6, 1926 at a depth of 3-4 m. Conglomerates of semi-transparent ice crystal plates appeared on seaweed about 20 cm. from the sea bottom. The water temperature near the sea surface was -2.5° to -2.6°C and slush ice covered the major portion of Krestovaya Bay.

SIP U6714

Chashchikhin, Vas.
SNOW LOSS FROM RAIN GAGES DUE TO WIND. (K voprosu o vyduvanii snega vetrom iz dozhdemernykh veder; Text in Russian). Meteorologicheskiĭ Vestnik, 36:47-48 incl. table, 1926. (Short notes and chronicles) 1 ref.
DLC, QC851.M5, v. 36

The accuracy of winter precipitation measurements was investigated at the Ufa meteorological station during the winter of 1925-26. The station is located in an open, elevated suburban area. Strong winds usually accompany snowfalls. Precipitation was measured with 2 gages, a standard gage with a Nipher shield, and one protected with an added cross-shaped diaphragm. Small differences were recorded for snowfalls in calm weather, but considerable differences were noted in cases of strong winds. The standard gage collected 66.7 mm. of snow; the gage equipped with the cross-shaped diaphragm collected 86.2 mm.

SIP U6715

Buchanan, John Young
ICE AND ITS NATURAL HISTORY. Proc. Roy. Inst. Gt. Brit. 19:243-276 incl. illus. tables, graphs, 1911. 6 refs.
DLC, Q41.R8, v. 19

The nature of the ice formed by freezing saline solutions is discussed on the basis of experiments. The crystals formed in freezing a non-saturated saline solution are pure ice, and the salt from which they cannot be freed belongs to the adhering brine. The f.p. and m.p., and the thermal expansion of ice containing NaCl are analyzed. Blocks of ice which contain, per 100 parts by weight of ice, less than 29.97, and more than 1.7164 parts of NaCl, the coefficient of apparent expansion is negative at all temperatures above -21.72°C. The cryoscopic equivalence between pressure and salinity, and the influence of impurity on the apparent latent heat of ice are discussed. The granular constitution of glacier ice, including the size of glacier grains, sun-weathering of the grains, and the grain of lake ice are discussed. The characteristics of advancing glaciers and glacial erosion are analyzed.

SIP U6716

Armstrong, Henry E.
LOW-TEMPERATURE RESEARCH AT THE ROYAL INSTITUTION, 1900-1907. Proc. Roy. Inst. Gt. Brit. 19:354-410 incl. illus. tables, diagrs. 1911. 7 refs.
DLC, Q41.R8, v. 19

The review of low temperature research includes the use of charcoal in producing high vacua, properties and structure of C, calorimetric studies, thermometry at low temperatures, and modifications in the properties of matter at low temperatures. Ice at low temperatures is discussed. It is assumed that ice is formed from one kind of complex molecules. The formation is an incomplete process of solidification.

The viscosity and plasticity of ice may be attributed to the fact that ice is not a homogeneous substance but an equilibrated mixture of solid and liquid molecules. The liquid molecules gradually become solid molecules and the ice becomes more nearly rigid. The expansibility of ice decreases at very low temperatures.

SIP U6717

Tammann, G.
THE FORMATION OF THE GLACIER GRAIN. (Die Bildung des Gletscherkorns; Text in German). Naturwissenschaften, 17:851-854 incl. tables, diagrs. Nov. 1, 1929. 4 refs.
DLC, Q3.N7, v. 17

Glacier ice, unlike river or sea ice, is a crystallite conglomerate with ice grains of an irregular polyhedral form, bounded by bent surfaces which fit so as to resist separation. A crystallized eutectic layer is between the grains at low temperatures, which melts with an increase in temperature. Layers of lower m.p. than that of ice exist between the grains, causing glacier ice to break into grains. Observations made on the recrystallization of ice by Tammann and Dreyer are reviewed. (See also SIP U5431)

SIP U6718

Ganesan, A. S. and S. Venkateswaran
A MEMOIR ON THE RAMAN EFFECT IN LIQUIDS. Indian J. Phys. 4:195-280 incl. tables, graphs, diagrs. 1929. [15] refs.
DLC, Q73.C3, v. 4

The results of a study of the Raman spectra of a large number of compounds, representative of well-defined chemical types, are described. The Raman spectrum of crystalline ice revealed 3 bands more or less sharp and distinctly resolved from one another whose shifts from the exciting line correspond to 2.82 μ, 2.95 μ and 3.13 μ. The 1.85-μ band is relatively much brighter in ice than in water, and the intensity of the 2.90-μ and 3.13-μ bands is about the same.

SIP U6719

SNOW MELTING PROBLEMS — AND ANSWERS. Heating, Piping Air Conditioning, 23:111, Oct. 1951.
DLC, TH7201.H45, v. 23

A water temperature of about 140°F is satisfactory for a pipe in a snow-melting system located in a 6-in. concrete slab; about 160°-170°F is required where the pipe is placed in the fill underneath. It is recommended that at least 2 in. of surfacing be over the pipe when a bituminous slab is used; concrete slabs should have at least 2.5 in. over the top of the pipe. A 40% solution of permanent antifreeze and water is suggested to prevent freezing. About 4-6 in. of crushed stone, washed gravel, or similar materials should be used as fill. Cinders and other S-bearing or acid-producing fills should be avoided. A melting capacity of 1 in./hr. of snow is adequate.

SIP U6720

GLACIOLOGICAL STUDIES ON MALASPINA GLACIER, ALASKA AND SASKATCHEWAN GLACIER, CANADA, IN 1953. Proj. NR081069, 6p. Nov. 1953. 3 refs. (Contract N6onr-24416)
SIPRE files

Work consisted of an attempt to resurvey the 1000-ft. bore hole and a research program bearing on the absolute amount, direction, and mechanics of flow within the Saskatchewan Glacier. No resurvey of the hole was possible since the supply of drill extensions was exhausted after 53 ft. of ice were drilled. A new interglacial forest locality well inside the present borders of the Malaspina Glacier was discovered. Ice samples for O-isotope analyses and D_2O determinations were collected. Velocity distribution with depth, surface and short-interval velocity measurements were made on the Saskatchewan Glacier. Megascopic structures in the ice, ablation measurements and other related glaciological studies were made. (See also SIP U4686)

SIP U6721

Drummond, Thomas
THE CANADIAN SNOWSHOE. Trans. Roy. Soc. Can. 3d ser. 10, sec. 2:305-320, illus. Dec. 1916.
DLC, AS42.R6, v. 10

A historical account of the development of the Canadian snowshoe is presented. Descriptions and examples of the principal types, its use and application are discussed. The types depend upon snow conditions, available material, frame, number of cross-bars, outline and shear, and webbing and size. Its military, exploration, engineering, and ordinary use are described. Illustrations of various snowshoe types with accompanying dimensions are included.

SIP U6722

Koloskov, P. I.
THE DEPTH OF WINTER SOIL FREEZING IN EUROPEAN USSR AND KAZAKHSTAN. (Glubina zimnego promerzaniia pochvy v Evropeĭskoĭ chasti SSSR i Kazakhstane; Text in Russian). Merzlotovedenie, 2, No. 1:36-43 incl. maps, 1947.
DA, 56.9AK12, 1947

Soil temperature observations at about 250 points in European USSR and Kazakhstan are mapped. An empirical formula for calculating the depth of soil freezing is presented using the mean annual soil temperature, mean annual temperature range at a soil depth of 40 cm., and a climatic index of soil moisture. The map of mean soil freezing shows 11 regions, where depth of soil freezing varied from 0-25 cm. to more than 250 cm. The second map shows the distribution of soil freezing depth in snow-free clay soil.

SIP U6723

Cabrera, B. and H. Fahlenbrach
VARIATION OF THE DIAMAGNETIC CONSTANT OF WATER WITH TEMPERATURE. (Variación de la constante diamagnética del agua con la temperatura; Text in Spanish with German summary). Anales soc. espaň. fís. y quím. 31:401-411 incl. tables, graphs, diagrs. June 1933. 18 refs.
DLC, QC1.S35, v. 31

The temperature relationship of the susceptibility of H_2O from 0°-100°C, and of ice from 0° to -60°C was investigated. The Faraday method of determining the energy effect of a nonhomogeneous magnetic field on the sample by torsion on the suspension spring was used. The apparatus was enclosed in a vacuum. High temperatures were controlled by electric heating and low temperatures by circulation of cold alcohol. The diagrams of susceptibility as a function of temperature show for H_2O a temperature coefficient of 1.15×10^{-4} and for ice 6.67×10^{-4}. The susceptibility decreased 2.2% on conversion into the solid phase. A value of -7.177×10^{-4} for H_2O at 0°C and -7.019×10^{-7} for ice at 0°C are obtained when a calibration value of -7.220×10^{-7} is used.

SIP U6724

Mäde, Alfred
THE TEMPERATURE COURSE DURING A WINTER NIGHT WITH OUTGOING RADIATION AND WITH A SNOW COVER. (Der Temperaturgang während einer winterlichen Ausstrahlungsnacht mit Schneedecke; Text in German). p.10-16 incl. tables, graphs. (In: Widerstandselektrische Temperatur-beobachtungen an einer mikroklimatischen Basisstation. Reichsamt für Wetterdienst, Wiss. Abhandl. 5, No. 3, 1938). 4 refs.
DLC, QC851.G4, v. 5

The temperature course at heights of 10, 20, 50, and 200 cm. above the ground with a 6-cm. snow cover from 6 p.m.-3 a.m. on a clear night is plotted and analyzed. It is shown that the temperature scattering is greatest in the layer nearest to the snow cover. It is concluded from the coefficient of vertical exchange and the temperature scattering that the large supercooling of the snow surface is essentially a result of radiation processes.

SIP U6725

Errera, J.
STUDIES IN THE NEAR INFRARED OF INTRA- AND INTERMOLECULAR BINDINGS. CHEMICAL CONSEQUENCES. (Liaisons intra- et intermoléculaires étudiées dans l'Infra-rouge proche. Conséquences chimiques; Text in French). Helv. Chim. Acta, 20:1373-1387 incl. graphs, diagrs. Dec. 1, 1937. 18 refs.
DLC, QD1.H4, v. 20

Spectra of OH radicals dissolved in CCl_4, of OH radicals in the vapor phase at different pressures, of mixtures of H_2O in dioxane from 6-40%, of 0.01% H_2O in CCl_4 and CS_2 and of ice and H_2O vapor are discussed from the point of view of H bonding. Liquid H_2O exhibits a maximum at 3400 cm.$^{-1}$ and an inflection at 3250. Ice has a maximum at 3250 with inflections at 3150 and 3350. The maximum in vapor and dilute solutions in inert solvents is, therefore, shifted from 3700 to 3400 cm.$^{-1}$ by intermolecular binding. (Chem. Abstracts)

SIP U6726

Griffiths, Ezer and R. W. Powell
EVAPORATION FROM WET SURFACES. p.230-231. (In: Dept. Sci. Ind. Res. Food Investigation Board, Rept. for 1936, London 1937)
DLC, TX360.G7A4, 1937

Evaporation from the surface of a cylinder with its axis parallel to the direction of the wind confirmed previous work that the rate of evaporation from unit length increases as the length of the surface decreases. The rate of sublimation of ice was measured by determination of the rate of loss in weight of an ice-coated sphere suspended from a balance in the center of a vertical wind tunnel, for a range of air speeds at about -10°C. Similar tests were made at normal temperatures with the surface covered with H_2O. The points for the ice and H_2O surfaces lie approximately on the same curve. It appears, therefore, that the rate of sublimation from an ice-covered surface can be deduced from the rate of evaporation of a water-covered surface of similar shape.

SIP U6727

Nikiforov, K.
SOME DYNAMIC PROCESSES IN PERMAFROST SOILS. (O nekotorykh dinamicheskikh protsessakh v pochvakh v oblasti rasprostraneniia pochvennoĭ merzloty; Text in Russian and French). Pochvovedenie, 14, No. 2:49-74 incl. illus. 1912. 1 ref.
DA, 57.8 P34, v. 14

The dynamics of soil freezing were studied in the Unakhinsk region during 1909-1911. Permafrost, seasonal and adventive frost or icing are differentiated. The presence of permafrost is evidenced by stone fields and mari or mud valleys. Permafrost was found in podzol sod of open valleys at a depth of 1.5-2 m., on marshy slopes at 0.70-1.2 m. and under sphagnum cover at 15-17 cm. The water impermeability causes moisture accumulation and the formation of mud flows and naleds. Complete freezing of rivers does not interrupt the water flow, but gives rise to taryn formations. Soil blisters or icings form over weak sections of frozen top soil.

SIP U6728

Allen, Clarence R. and George I. Smith
SEISMIC AND GRAVITY INVESTIGATIONS ON THE MALASPINA GLACIER, ALASKA. Trans. Am. Geophysl. Union, 34:755-760 incl. graphs, maps, diagr. Oct. 1953. 12 refs.
DLC, QE500.A6, v. 34

Seismic and gravity measurements made during July and Aug. 1951 to determine ice thickness and configuration of the subglacial floor are discussed. Reflections from the bedrock obtained along a 10-mi. profile indicated ice thicknesses from 1130-2050 ft. Good reflections were obtained with 1-oz. dynamite charges in 26-ft. water-filled shot holes in relatively crevasse-free areas. The seismic method seems to be well suited for glacier-thickness measurements, especially where crevassing and the firn layer are at a minimum.

SIP U6729

Rhodes, Forrest L.
REPORT OF THE COMMITTEE ON SNOW, 1951-1952. Trans. Am. Geophysl. Union, 34:777-779, Oct. 1953.
DLC, QE500.A6, v. 34

Brief reports from the various members of the Committee are given. Research under way at SIPRE, the Priest River Experimental Forest (Idaho), in Calif. and current programs of the Cooperative Snow Investigations are discussed.

SIP U6730

Nye, J. F.
THE FLOW LAW OF ICE FROM MEASUREMENTS IN GLACIER TUNNELS, LABORATORY EXPERIMENTS AND THE JUNGFRAUFIRN BOREHOLE EXPERIMENT. Proc. Roy. Soc. (London), 219A:477-489 incl. graphs, Oct. 7, 1953. 14 refs.
DLC, Q41.L7, v. 219A

General equations for the 3-dimensional flow of a mass of ice are formulated. The behavior of cylindrical and spherical holes in a medium showing non-Newtonian viscosity are calculated and the theory compared to 4 recent experiments from which the flow laws may be inferred. Satisfactory agreement was found between all results except for the tunnel observations by Haefeli in the Lower Arolla Glacier. The reason for this anomaly is uncertain.

SIP U6731

McLennan, J. C., R. Ruedy, and A. C. Burton
AN INVESTIGATION OF THE ABSORPTION SPECTRA OF WATER AND ICE, WITH REFERENCE TO THE SPECTRA OF THE MAJOR PLANETS. Proc. Roy. Soc. (London), 120A:296-302 illus. graphs, Sept. 1, 1928. 23 refs.
DLC, Q41.L7, v. 120A

The absorption of water and ice for a continuous spectrum in the visible range is compared. Photographs of the source spectrum were taken through artificial ice, 4, 8, and 14 m. thick. The absorption of ice has no distinct edge, but gradually increases with a considerable shift of the absorption bands towards the longer wave lengths. Little absorption occurs in ice in the region where the absorption is strong in water.

SIP U6732

de Quervain, M.
THE GRAIN STRUCTURE OF SNOW. (Das Korngefüge von Schnee; Text in German). Mitt. Eidg. Inst. f. Schnee- u. Lawinenforschung, No. 6:1-12 incl. illus. tables, graph, May 1948. 2 refs. (Reprint)
DWB, Unclassed

Fine-grained, coarse-grained and wind-packed snow samples were microscopically investigated as thin and polished sections. Polished sections, with ethyl laurate as a filler, were dyed with printer's ink and photographed in the same position after every cut. Thin sections were prepared by Bader's method, with the addition of a drop of vaseline or paraffin oil in order to liquify the pore filler. The extinction position of the grains in the principal section was measured, and the grain-size distribution was determined. The anisotropy of crystal plasticity appears to be of subordinate significance as long as the pore space offers a certain textural freedom. (See also SIP U1382)

SIP U6733

Akimov, A. T.
SPECIFIC ELECTRICAL RESISTANCE OF FROZEN SOILS. Compt. rend. Acad. sci. URSS, 16 (N. S.), No. 8:405-407 incl. graphs, 1937.
DLC, Q60.A52, v. 16

The specific electrical resistance of frozen soils was measured in a box cooled by a mixture of ice and salt to -20°C. A miniature 4-electrode Schlumberger apparatus was mounted on the metallic box containing the soil, and measurements were made by the compensation method using a Raps potentiometer. Sand, sandy soil and clayey soil were studied as a function of moisture and temperature. The specific resistance increased from thawed to frozen soil, and considerable specific resistance variations occurred in the frozen soil due to negative temperature variations.

SIP U6734

Shirshov, P. P.
OCEANOLOGICAL OBSERVATIONS. Compt. rend. Acad. sci. URSS, 19 (N. S.), No. 8:569-580 incl. table, graphs, 1938.
DLC, Q60.A52, v. 19

The velocity of the current produced by the drift of ice decreases rapidly with depth. Plankton observations confirmed that the absence of light under the ice cover prevents flowering in Polar seas. The ice cover encountered during the Soviet Polar Expedition is described. Vibrations of the ice cover, caused by strong winds, were observed by oscillations of a bubble in the level of an astronomical theodolite fixed on the ice surface.

SIP U6735

Shoulejkin, W. W.
THE DRIFT OF ICE-FIELDS. Compt. rend. Acad. sci. URSS, 19 (N. S.), No. 8:589-594 incl. graph, diagr. 1938.
DLC, Q60.A52, v. 19

An equation is derived relating the drift velocity to the wind velocity. The theoretical conclusions are compared with results of observations made by the Soviet Polar Drift Station. No traces of currents of non-drift origin throughout the drift of the station were found. The East-Greenland current is found to be purely of drift origin, caused by the movement of ice. (See also SIP U3233)

SIP U6736

Grigorev, A. A.
MAIN PHYSICO-GEOGRAPHICAL FEATURES OF LAND IN THE ARCTIC BELT. Compt. rend. Acad. sci. URSS, 19 (N. S.), No. 8:607-610, 1938.
DLC, Q60.A52, v. 19

The arctic belt is divided into the high arctic formed by the 0°C isotherm of the warmest month, and the outer arctic formed by the 5°C isotherm. Land in the high arctic is characterized by a negative heat balance during all the seasons and a negative balance of gravitation in the lower atmospheric layers. This combination causes a positive balance of ice and a negative balance of liquid water. The foregoing conditions are less pronounced during 10 months in the outer arctic. The heat balance is negative at a ground depth of 0.2-1.3 m. during the other 2 months, resulting in deep frost penetration. Appreciable vegetative growth is observed only on soils with a small moisture-absorbing capacity, or on areas with good drainage.

SIP U6737

Cassel, E. J.
ULTRA-VIOLET ABSORPTION OF ICE. Proc. Roy. Soc. (London), 153A:534-541 incl. illus. graphs, diagrs. Feb. 1, 1936. 11 refs.
DLC, Q41.L7, v. 153A

The absorption of thin films of ice was measured in the extreme ultraviolet range. A vacuum spectrograph was used with fluorite prisms and lenses transparent down to 1400 A. The absorption band of ice is found to be shifted towards short waves, relatively to that of vapor by 0.6-0.7 electron volts. A comparison of the absorption of heavy and light ice indicates a shift of the heavy ice absorption towards short waves by about 1300/cm., by the same order as observed by Franck and Wood for water vapor. It is concluded that the electronic excitation produces a marked decrease in the dipole moment of ice.

SIP U6738

Usachev, P. I.
BIOLOGICAL ANALYSIS OF ICE-FLOES. Compt. rend. Acad. sci. URSS, 19 (N. S.), No. 8:645-648 incl. map, 1938. 6 refs.
DLC, Q60.A52, v. 19

Ice samples from the upper, middle and lower parts of ice floes in the Kara Sea were biologically analyzed. Analyses of ice floes from 3 different locations in the Kara Sea are discussed, and correlated with the origin of the ice. Ice of marine, fluvial and mixed origin was determined.

SIP U6739

Fersman, A. E.
GEOCHEMISTRY AND MINERALOGY OF POLAR REGIONS. Compt. rend. Acad. sci. URSS, 19 (N. S.), No. 8:619-623, 1938. 10 refs.
DLC, Q60.A52, v. 19

A number of geochemical and geological processes typical of Polar regions and produced by the combination of a low velocity of chemical processes with the absence of large quantities of fluid water are discussed. Ice is considered as a mineral proper to the climatic conditions prevailing in Polar regions. It is insufficiently studied as a mineral. Ice presents a 3-phase system of 2 components ($H_2O + O_2$). Needles and lamellae of hydrohalite ($NaCl \cdot 2H_2O$) and of its cryohydrate, the cryohalite which form during the freezing of salt water below 5°C, are often mistaken for ice crystals.

SIP U6740

Vernadsky, V. I.
ON SOME CURRENT PROBLEMS IN THE STUDY OF THE ICE OF THE ARCTIC REGIONS. Compt. rend. Acad. sci. URSS, 19 (N. S.), No. 8:625-628, 1938. 7 refs.
DLC, Q60.A52, v. 19

More research is urged concerning the composition of arctic waters and ice, and a comparison with those of the antarctic; the removal of Si from sea water and from solid clay particles by diatoms and the connection of this with near-polar location of diatomaceous silts; cosmic dust, a good trap for which should be arctic and antarctic ice fields.

SIP U6741

Bogorov, B. G.
BIOLOGICAL SEASONS OF THE ARCTIC SEA. Compt. rend. Acad. sci. URSS, 19 (N. S.), No. 8: 641-644 incl. table, diagr. 1938. 4 refs.
DLC, Q60.A52, v. 19

The relationship between biological seasons in plankton and ice conditions may be used for local ice prognoses. The seasonal distribution of phytoplankton and zooplankton in different arctic seas was ob-

served and a relationship was established between the variation and the ice conditions. The ratio of phytoplankton to zooplankton is a value characterizing the seasonal stage of plankton development in a given sea.

SIP U6742

Boyle, R. W. and C. D. Reid
PRACTICAL EXPERIMENTS ON THE DETECTION OF ICEBERGS AND ON SOUNDING BY MEANS OF AN ULTRA-SONIC BEAM. Proc. Trans. Roy. Soc. Can. 3d ser. 20, sec. 3:233-243 incl. illus. Jan. 1926. 5 refs.
DLC, AS42.R6, v. 20

Tests were initiated to determine iceberg detection through the reflection of ultrasonic waves of an electronic oscillator. The small difference between the density of sea water and ice points to the small reflective power of icebergs. The range of an echo off rock was found to be 4 times that of ice. The detecting beam must be intense and of very narrow angle for detecting ice in shallow water.

SIP U6743

Kodaira, Yoŝio
ON THE GROWTH OF SILVER THAW. Geophys. Mag. (Tokyo), 7:1-8 incl. tables, diagrs. 1933. 1 ref.
DWB, 551.05 J35g, v. 7

Formulas for rime growth are given and illustrated for various conditions assuming a simplified streamline motion with the cylinder axis perpendicular to the streamlines. The figures cannot be generally applied under natural conditions in mountainous areas due to radical changes in the wind velocity.

SIP U6744

Miyake, Yasuo and Hideo Matui
FREEZING POINT, OSMOTIC PRESSURE, BOILING POINT AND VAPOUR PRESSURE OF SEA WATER. Geophys. Mag. (Tokyo), 13:111-116 incl. tables, graphs, 1939-1940. 2 refs.
DWB, 551.05 J35g, v. 13

The freezing points of 6 sea-water samples were measured. The relation between the chlorinity and f.p. depression is expressed as a simple linear equation. The f.p. depression varied from 1.895-0.195 at a Cl content of 18.34-1.90 p.p.m. The values obtained by the new formula agree with measurements within ± 0.005°C. Values derived through the Knudsen-Hansen formula deviate from measurements by about 0.08°C.

SIP U6745

Nikitin, S. A.
AGRICULTURAL METHODS IN THE YAKUTSK REGION. (Tekhnika zemledeliĵa v ĵAkutskom okruge; Text in Russian with English summary). Materialy Komissii po Izucheniĵu ĵAkutskoĭ Avtonomnoĭ Sovetskoĭ Soŝialisticheskoĭ Respubliki, 29:1-237, 361-364 incl. illus. tables, maps, diagrs. 1930. 27 refs.
DLC, DK771.Y2A18, v. 29

The conditions and methods for agriculture in the area between 60°-62°N. lat. and 98°-104°E. long. were investigated in 1926. July is the only frost-free month and the growing season lasts about 125 days. A scant snow cover occurs from Oct.-April reaching a maximum depth of 37 cm. in March. The depth of permafrost in the area varies widely up to 150 cm. Permafrost was found at depths of 130-150 cm. under sandy soil along the Lena River and at depths of 70-80 cm. in swampy areas. The depth of permafrost varied between 70-120 cm. in forested areas along the Amga River, depending on the forest density.

SIP U6746

Nikolaenko, M. G.
FROST HEAVING AND CONTROL. (Puchinoobrazovaniĵa i bor'ba s nimi; Text in Russian). Stroitel'stvo Dorog, 1, No. 1:11-14, 1938.
DLC, TE4.S73, v. 1

Frost heaving is classified according to the water regime of the roadbed and control methods. Surficial heaves are formed under conditions of excessive surface water, silty ground containing particles of which 45-90% are 0.5-0.005 mm. in size, and wherever ground water is near the surface. Surface heaves are controlled by constructing air spaces 0.4-0.6 m. under the soil surface, applying compacted layers (10-20 cm.) of gravel and drainage. Deep heaving is controlled by replacing ground at 0.5 to 0.6-m. depth with gravel or coarse, sandy material, by preventing the capillary rise of water, and by drainage pipes on slopes.

SIP U6747

Kelsey, Samuel T., Jr.
NAKNEK AIRPORT CONSTRUCTION ON BERING SEA... Pacific Builder and Engineer, 51, No. 9:60, 62 incl. illus. Sept. 1945.
DLC, TH1.P2, v. 51

The drainage difficulties of the runway subbase aggravated by nearby permafrost are discussed and the construction techniques are described. All moss and black top soil was removed from the subgrade well below finished grade line in deep fill areas. As much as 7 ft. of clay was removed below finished grade line where ground water was prevalent. Culverts were installed 6 ft. below the surface to drain ground water entering from the edge of the permafrost. The materials and amounts used in paving the runways are given.

SIP U6748

Baroni, E. and A. Fink
INVESTIGATIONS OF THE CONCENTRATION OF D_2O IN NATURAL ICE. II. (Untersuchungen über die Konzentration von D_2O in natürlichem Eis. II; Text in German). Monatsh. Chem. 67:131-136 incl. tables, graphs, 1935. 2 refs.
DLC, QD1.M7, v. 67

Twenty-one samples of glacier ice from various parts and depths of a Caucasian glacier were analyzed. Both increases and decreases in comparison with the normal D_2O content were found. The content is usually normal in valleys with flowing water and on the surface of glaciers. Increases occur mainly at points below the surface.

SIP U6749

Baroni, E. and A. Fink
INVESTIGATIONS OF THE CONCENTRATION OF D_2O IN NATURAL ICE. III. (Untersuchungen über die Konzentration von D_2O in natürlichem Eis. III; Text in German). Monatsh. Chem. 67:193-195 incl. table, 1935. 2 refs.
DLC, QD1.M7, v. 67

Nineteen snow and rime samples were analyzed for D_2O content. Snow shows no variation in normal content regardless of age. Rime shows increases of 15-50% above the normal due to fractional crystallization.

SIP U6750

Baroni, E. and A. Fink.
INVESTIGATIONS OF THE CONCENTRATION OF D_2O IN NATURAL ICE. IV. (Untersuchungen über die Konzentration von D_2O in natürlichem Eis. IV; Text in German). Monatsh. Chem. 71:128-130 incl. table, 1937. 5 refs.
DLC, QD1.M7, v. 71

It was shown, in agreement with previous experiments, from a study of 9 snow samples that rain, snow, and thaw water are lighter than inland and sea water. The deficiency in D_2O amounts to 25% when the normal content in D_2O is assumed to be 0.02%.

SIP U6751

Arakawa, Kiyoshi and Keiji Higuchi
STUDIES ON THE FREEZING OF WATER. (I). J. Faculty Sci. Hokkaido Univ. Ser. II, 4:201-208 incl. illus. tables, diagrs. Sept. 1952. 9 refs.
DLC, QC1.S23, v. 4

Successive photographs were taken of freezing water, initiated with and without seeding, to study the growth of ice crystals. An apparatus is described for obtaining shadow photographs of ice crystals, by exposing photographic paper under a shallow dish of water and illuminating the water surface. The crystal forms produced on the water surface and in the water are classified into needle, feather-like, disc, and stellar types. The disc type is produced only in freezing initiated by seeding and grows into a stellar crystal.

SIP U6752

Ramakrishna Rao, I.
THE RAMAN EFFECT IN CRYSTALS. Indian J. Phys. 3:123-129 incl. illus. table, 1928. 7 refs.
DLC, Q73.C3, v. 3

The Raman effect was studied in crystalline ice and quartz. The difference between the incident and scattered frequencies corresponds to the characteristic infrared frequencies of the crystals. The bands observed with ice are sharper and of shorter wave length as compared with those of water. This observation agrees with the infrared absorption data.

SIP U6753

Mukai, Masayuki
ON THE SEICHES OF A FROZEN LAKE, AND THE MOTION OF ICE — PLATE. Proc. Phys. Math. Soc. Japan, 14:108-111 incl. graphs, March 1932. 1 ref.
DLC, QA1.T76, v. 14

The seiches of Lake Suwa (Nagano, Japan) were determined with a limnimeter from the movements of a water surface kept clear of ice. The vertical motion of the ice sheet covering the lake was recorded simultaneously by a specially constructed recorder. The seiches of the frozen lake are quite similar to those of the unfrozen lake, and synchronize accurately with movements of the ice sheet. (See also SIP U5838)

SIP U6754

Moesveld, A. L. Th.
COMBATING ICE. (Ijsbestrijding; Text in Dutch with English summary). Chem. Weekblad, 31:170-176, March 10, 1934. 6 refs.
DLC, QD1.C6885, v. 31

Methods for combating ice in rivers and canals are reviewed. A description is given of experiments on ice formation in tanks, 1 sq. m. in area and 0.4 m. deep, under controlled temperature conditions and with the addition of minute amounts of surface-active chemicals. The chemicals were of dipole character, low gravity, and small solubility. The results were very pronounced, and in some cases caused the ice formed to consist of a spongy mass of needles as against solid clear ice in the control tank.

SIP U6755

Ramsay, Henrik
IN BATTLE WITH BALTIC ICE; A BOOK ON FINLAND'S WINTER NAVIGATION. (I kamp med Östersjöns isar; en bok om Finlands vintersjöfart; Text in Swedish). Helsingfors, Holger Schildts Förlag, 1947, 415p. incl. illus. tables, graphs, maps.
DN-HO, GB2401.R17, 1947

A history of winter navigation along the Finnish coast is presented. Winter navigation depends on ice-breaker service, sturdily constructed ships, and good seamanship. The formation of various kinds of sea ice is described briefly and graphs indicate the distribution, duration (1880-1938) and variation (1830-1940) of sea ice. The years of 1871, 1877, 1881, 1888, 1893 and 1940 show almost a 100% ice cover on the 420,000-sq. km. surface of the Baltic Sea.

SIP U6756

Imbert, Bertrand
SEISMIC SOUNDINGS IN ADELIE LAND. (Sondages séismiques en Terre Adélie; Text in French). Ann. géophysique, 9:85-92 incl. illus. tables, graphs, map, Jan.-March 1953. 11 refs.
Arctic Inst. N. Am.

Results of charges released at 30, 80, 185, and 290 km. from the coast on the Port-Martin meridian are presented. Ice-thickness values were 190-205 m. at the 80-km. point and 490 m. at the 290-km. point. Values of 1000 m. and 3000 m. are obtained at these 2 points by applying the Nye theory in which the thickness of the moving sheet is inversely proportional to the surface slope. The assumption of a moving ice cap and an excess of accumulation over ablation were verified. The discrepancy between the 2 methods is probably due to the complexity of the relief causing the ice thickness and surface slope to vary rapidly with horizontal displacement.

SIP U6757

Kurtyka, John C.
RAIN AND SNOW GAGING METHODS. p.3-62 incl. illus. tables, graphs, diagrs. (In: Precipitation Measurements Study, by John C. Kurtyka, Rept. of Investigation No. 20, Ill. State Water Survey Div. 1953)
DWB, Unclassed

A study of all known methods of measuring precipitation was made with a view to adapting one of these techniques to unattended automatic weather station operation. The specifications of non-recording, and self-recording gages are given, and illustrations are used to clarify description of the various gages. It is concluded that existing gages, although adequate for rain measurement, must be improved to satisfactorily measure snow.

SIP U6758

Kurtyka, John C.
PRECIPITATION MEASUREMENTS BIBLIOGRAPHY. p.63-177. (In: Precipitation Measurements Study, by John C. Kurtyka, Rept. of Investigation No. 20, Ill. State Water Survey Div. 1953)
DWB, Unclassed

The bibliography consists of 1079 references pertaining to methods and instruments for measuring rain and snow. Most of the references are annotated. The entries are arranged alphabetically by author, and a subject index is included.

SIP U6759

Rudovič, L.
SNOW EVAPORATION. (Isparenie snega; Text in Russian). Meteorologicheskiĭ Vestnik, 34: 50-52 incl. tables, 1924.
DWB, M(50)R969me, v. 34

A glass container filled with snow was placed into the snow cover to measure snow evaporation at the Meteorological Observatory of the Forest Institute (near Leningrad) during Jan.-April 1918. Frequent snowstorms during Jan.-Feb. lowered the accuracy of the measurements and only March-April data were analyzed. Evaporation during March was equivalent to about 5.0 mm. of water and condensation amounted to about 1.7 mm. Evaporation attained a maximum from 7 a.m.-1 p.m. and a minimum from 9 p.m.-7 a.m. when condensation was high. Condensation amounted to 2.1 mm. and evaporation 1.6 mm. during 14 days of high humidity in April. Maximum daily evaporation was 0.5 mm. and condensation 0.3 mm. The rate of evaporation-condensation processes correlates well with the differences between the absolute air humidity and the vapor tension at the temperature of the snow surface.

SIP U6760

Tammann, G. and W. Müller
THE TRANSITION FROM BRITTLENESS TO THE DEFORMATION OF CRYSTALS WITH INCREASING TEMPERATURE. (Der Übergang von der Sprödigkeit zur Verformbarkeit bei Kristallen mit steigender Temperatur; Text in German). Z. anorg. u. allgem. Chem. 224:194-212 incl. illus. tables, diagrs. Sept. 13, 1935. 14 refs.
DLC, QD1.Z4, v. 224

The action of various crystals on deformation is discussed. Fractures in the different crystal planes give characteristically different fissures. The effects of temperature and pressure on crystal deformation are analyzed. Ice deforms under the action of slowly applied external forces. Its sliding plane is the basal pinacoid. If melting ice is scratched, a depression without barrier and scratching dust are formed. A few irregular fissures form from the depression which increase in number at -80° and -180°C whereas the width of the depression decreases. A pressure hole without barrier, from which fissures emanate, is formed when a needle point is pressed into melting ice. Pieces of ice break off around the hole when pressure is increased. The hole becomes less deep at the same pressure but with decreasing temperature, and the breaking-off of ice pieces becomes less frequent. Ice at its m.p. is as brittle as rock salt 700°C below its m.p.

SIP U6761

Anderson, Charles E.
EVALUATION OF RESULTS OF JOINT AIR FORCE-WEATHER BUREAU CLOUD SEEDING TRIALS CONDUCTED DURING WINTER AND SPRING 1949. Geophysl. Res. Paper #4, Air Force Cambridge Research Labs. 29p. incl. tables, graphs, May 1950. 35 refs.
SIPRE files, S-179

The question of the modification of natural clouds by artificial seeding is examined in terms of current theoretical considerations as to physical-chemical and meteorological effect of seeding agents on clouds. The results of experimental laboratory studies made in this country and abroad on the formation of the ice phase and precipitation are reviewed. The results of the joint Air Force-Weather Bureau seeding trials then are studied in light of these theoretical considerations. The combined theory and experiments point to little likelihood of large-scale weather control using present techniques. (Author's abstract)

SIP U6762

Richard, R.
COMPARISON OF VARIOUS TEMPERATURE MEASUREMENTS IN THE AIR, ON THE SNOW, AND WITHIN THE SNOW. Météorologie, 2:331-335 incl. tables, diagr. July 1926.
DWB, Unclassed

The following temperatures taken at the meteorological observatory of Mont-Valérien from Dec. 13-17, 1925 are tabulated: daily minimum night temperatures in the shelter and on the snow surface, simultaneous air temperatures in the shade and in the sun, within the snow cover and on the snow surface, simultaneous temperatures at 6-cm. depth in variously exposed parts of the snow covering a log, and simultaneous temperatures of the air and the inside of a snowball caught in a treefork.

SIP U6763

Bucher, Edwin
AVALANCHE NOMENCLATURE. (Nomenklatur der Lawinen; Text in German). Mitt. Eidg. Inst. f. Schnee- u. Lawinenforschung, No. 7:3-10 incl. illus. May 1949. 6 refs. (Reprint)
DWB, Unclassed

The terms loose-snow and snow-slab avalanches are justified. Snow slab is a collective concept with no reference to wind action or cause for compaction. The mechanics of fracture are stressed in Bucher's avalanche classification. The fracture of loose-snow avalanches occurs at a point source; that of snow-slab avalanches occurs along a wide line.

SIP U6764

Schild, Melchior
CONCERNING THE OBSERVATION AND RECORDING OF DESCENDED AVALANCHES BY FORESTRY PERSONNEL. (Zur Frage der Beobachtung und Registrierung niedergegangener Lawinen durch Forstpersonal; Text in German). Mitt. Eidg. Inst. f. Schnee- u. Lawinenforschung, No. 7:11-16 incl. illus. May 1949. 1 ref. (Reprint)
DWB, Unclassed

The development of the Swiss avalanche service is traced, and its functions are outlined. Basic research, avalanche defensive measures and reforestation problems are stressed. The field service consists of 24 comparative stations distributed throughout the Swiss Alps which provide the necessary data for avalanche bulletins regularly issued by the central office at Weissfluhjoch.

SIP U6765

[Schild, Melchior]
THE PREVENTION OF AVALANCHE ACCIDENTS. (Zur Vermeidung von Lawinenunfällen; Text in German). Mitt. Eidg. Inst. f. Schnee- u. Lawinenforschung, No. 7:17-20 incl. table, May 1949. (Reprint)
DWB, Unclassed

The avalanche-accident prevention program of the Swiss avalanche service is discussed. Avalanche bulletins are published to orient tourists about existing avalanche conditions; lectures and visual aids are provided to all tourist organizations for instruction purposes; films are provided to show proper search and rescue methods.

SIP U6766

Peyriguey, Jacques
SIMULTANEOUS INFLUENCE OF WIND AND RIME ON BREAKS OF TELEGRAPH LINES IN THE MOUNTAINS. (Influence simultanée du vent et du givre sur les ruptures des lignes télégraphiques en montagne; Text in French). Météorologie, 9:345-348 incl. tables, Aug. 1933.
DWB, Unclassed

The causes of line breaks are analyzed. Lines are chosen to withstand loads up to 3.3 kg./m. the load of the wire alone being 0.164 kg./m. Calculations show that a wind speed of 70 m./sec. produces a line load of 0.674 kg./m.; a rime load of 0.920 kg./m. produces a line load of 1.084 kg./m.; the same rime load at a wind speed of 30 m./sec. produces a line load of 6.095 kg./m. Lines break when icing and wind occur simultaneously.

SIP U6767

Baldit, A.
A CASE OF GLAZE OBSERVED AT THE PEAK ON FEB. 11, 1936. (Sur un cas de verglas observé au Puy le 11 février 1936; Text in French). Météorologie, 12:61-62 incl. diagr. Jan.-Feb. 1936.
DWB, Unclassed

Hollow stalactites of ice, 20 mm. long, 4 mm. in outside diam. with a wall 0.2 mm. thick, formed at an air temperature between -1° and +1°[C] during a 2.5-hr. observation period. A theory for such formations is presented. A formula is derived showing that ice only a fraction of a mm. thick is sufficient to prevent freezing of the water contained therein.

SIP U6768

Barray, A.
EFFECTS OF RIME ON ELECTRIC LINES. (Effets du givre sur les lignes aériennes de transport d'énergie électrique; Text in French). Météorologie, [15]:128-132 incl. illus. diagr. March, April 1939.
DWB, Unclassed

Rime remaining on electric wires increases daily in density. Additional rime builds up at air temperature of or barely below 0°C or when the sun hits the frosted lines and produces partial fusion followed by freezing. The rime thickness is independent of the composition and diameter of the wire and the rime formation is eccentric in relation to the wire. Weight accretion due to rime amounts roughly to 3, 5, 9, 12 kg./m. at altitudes up from 700, 900, 1000, 1200 m. respectively.

SIP U6769

Mezin, M.
ICE FLOWERS ON THE LAC DE SAINT-POINT. (Fleurs de glace sur le lac de Saint-Point; Text in French). Météorologie, [15]:187-189 incl. illus. May-June 1939. (Notes and correspondence)
DWB, Unclassed

Two photographs of ice flowers formed on a lake-ice cover 15-20 cm. thick at temperatures between -10° and -15°[C] are analyzed. The first photograph shows ice flowers 10 cm. large leaning slightly to the windward. These flowers are rime formations due to freezing of supercooled fog droplets. The second photograph shows an ice-flower formation resembling hoarfrost needles. This formation occurred in a calm area on the lake and is due to the excess of the maximum water-vapor pressure of supercooled water over the maximum water-vapor pressure of ice.

SIP U6770

Martin, J. E.
TOTALIZER SNOW GAGES. (Nivomètres totalisateurs; Text in French). Météorologie, [15]:230-232, July-Aug. 1939.
DWB, Unclassed

The use of totalizers to measure combined snow and rain precipitation over long periods of time is discussed. It is felt that all totalizers are useless in measuring snowfall and that accuracy in snowfall measurements requires the constant presence of an observer.

SIP U6771

Barbé, G.
BRIEF NOTE ON ICING. (Note succinte sur le givrage; Text in French). Météorologie, [15]:280-287, Nov.-Dec. 1939.
DWB, Unclassed

Aircraft icing is defined. The locations, types, and consequences of icing are analyzed. Icing danger can be estimated and localized through a study of weather reports. Serious icing trouble is likely during flight only when the temperature of the air surrounding the plane is below freezing. Icing is maximum between 0° and -10°C, diminishes around -15°C, and becomes negligible at temperatures below -20°C.

SIP U6772

Viaut, A.
STUDY ON ICING. (Étude sur le givrage; Text in French). Météorologie, [15]: 158-186 incl. graphs, maps, diagrs. May, June 1939. 1 ref.
DWB, Unclassed

General and local meteorological conditions conducive to icing are discussed. The degree of icing depends primarily on the synoptic vertical distribution of temperatures and the water content of clouds and secondarily on the nature of air masses, type of clouds and their relative position to ground relief. Flying methods which avoid icing are discussed. Five typical cases of airplane icing are analyzed.

SIP U6773

Kyriazopoulos, B.
A METHOD FOR REGISTERING DEW, HOARFROST AND RAIN. (Une méthode d'enregistrement de la rosée, la gelée blanche et la pluie; Text in French). Météorologie, [15]:29-38 illus. tables, Jan.-Feb. 1939. 10 refs.
DWB, Unclassed

Traces of dew, hoarfrost and rain were obtained on glossy paper weighing 73 gm./sq. ft. covered with a layer of soot 0.04-mm. thick. The paper was tacked, glossy side up, on a frame 15 cm. above ground. The differences between dew, rain, and hoarfrost traces are discussed. A drosograph is described in which sections of a soot-covered paper are successively exposed to nocturnal thermal radiation.

SIP U6774

Zingg, Th.
METEOROLOGY. (Meteorologie; Text in German). p.5-24 incl. tables, graphs. (In: Schnee und Lawinen im Winter 1949/50. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 14, 1951)
DWB, Unclassed

Monthly synoptic data with special reference to individual areas are given for the period from Oct. 1949-June 1950. Sunshine duration, global radiation, air temperature, humidity, frequencies of wind directions and speeds, cloudiness, precipitation, snow depth, and meltwater amounts are presented.

SIP U6775

in der Gand, H.
SNOW AND AVALANCHES IN THE PARSENN AREA. (Schnee und Lawinen im Parsenngebiet; Text in German). p.25-42 incl. tables, graphs, maps, diagrs. (In: Schnee und Lawinen im Winter 1949/50. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 14, 1951). 1 ref.
DWB, Unclassed

Layer, ram, and temperature profiles were taken at the beginning and middle of each month. The development of the snow cover is traced in relation to weather conditions. The 3 periods differentiated are early, mid- and late winter, and are characterized by the formation of the foundation, growth of the snow cover, and the decay of the snow cover respectively. Uninterrupted snow-cover duration, snow depths and new-snow amounts are tabulated. The winter was characterized by a solid profile with the exception of some loose intermediate layers. The avalanche frequency was moderate. A loose intermediate snow layer formed the gliding surface for most avalanches; the avalanches consisted mainly of new-snow deposits.

SIP U6776

Schild, M.
SNOW AND AVALANCHES IN THE REMAINING SWISS ALPINE AREAS. (Schnee und Lawinen im übrigen schweizerischen Alpengebiet; Text in German). p.43-74 incl. tables, graphs. (In: Schnee und Lawinen im Winter 1949/50. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 14, 1951)
DWB, Unclassed

Snow-depth data are reported from the various stations comprising the network of avalanche service throughout Switzerland. Maximum and mean depths are compared and the water content of the snow cover is obtained. The winter was warmer than average, and the precipitation corresponded approximately to the long-period mean values. The snow cover was characterized by a foundation of low bearing capacity, but with 2 distinctly pronounced strong zones separated by intermediate layers of poor cohesion. Avalanche activity was most pronounced during and after the 2 greatest snowfalls. A list of avalanche bulletins issued by radio and press from Dec. 16, 1949-April 18, 1950 is included.

SIP U6777

Schild, M.
ACCIDENTS AND DAMAGES CAUSED BY AVALANCHES. (Durch Lawinen verursachte Unfälle und Schäden; Text in German). p.75-85 incl. illus. tables, graphs, map. (In: Schnee und Lawinen im Winter 1949/50. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 14, 1951)
DWB, Unclassed

Accounts of 32 accidents caused by avalanches in the Swiss Alps are presented. Names, dates, location, cause, and rescue methods are included. Accidents which occurred in Austria, France, Italy, Norway and New Zealand are cited.

SIP U6778

Zingg, Th.
CONTRIBUTION TO THE KNOWLEDGE OF MELTWATER RUN-OFF FROM THE SNOW COVER. (Beitrag zur Kenntnis des Schmelzwasserabflusses der Schneedecke; Text in German). p.86-90 incl. graphs. (In: Schnee und Lawinen im Winter 1949/50. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 14, 1951). 6 refs.
DWB, Unclassed

A relationship between meltwater amount and diurnal temperature was established from experimental observations made on the Weissfluhjoch experimental field (2540 m. above sea level) on a 5.19-sq. m. surface area. The amount of run-off was found to be equal to 4.5 times the sum of the positive diurnal mean temperatures. Radiation, sunshine duration and wind do not significantly influence the mean values. Snow depth is of considerable influence on the daily course of meltwater run-off. The empirical equation provides a check on the amount of solid precipitation in high mountains when the date of the beginning of the melting period is known, and renders possible the calculation of the possible minimum meltwater amount of an ablation period.

SIP U6779

REFERENCES TO FURTHER INVESTIGATIONS AND TASKS CARRIED OUT DURING THE WINTER 1949/50. (Hinweise auf weitere im Winter 1949/50 durchgeführte Untersuchungen und Arbeiten; Text in German). p.91-92. (In: Schnee und Lawinen im Winter 1949/50. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 14, 1951)
DWB, Unclassed

Numerous evaporation measurements were made

using plexiglass vessels, and the accuracy of water-equivalent measurements of the snow cover was tested using vertical sondes. Crystallographic investigations included observations of snow metamorphism in various layers of snow samples, and studies of thin sections of snow from the Greenland Inland Ice. Measurements with the 2-component snow pressure apparatus were continued and a single pile-like unit was erected to measure snow pressure on objects such as telephone poles. Field and laboratory studies included snow-hardness measurements with the 3 types of hardness testers, and shearing strength measurements. Walls for snowdrift control were erected. Active research on aircraft and power line icing was initiated.

SIP U6780

Zingg, Th.
METEOROLOGY. (Meteorologie; Text in German). p.7-29 incl. tables, graphs. (In: Schnee und Lawinen im Winter 1950/51. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 15, 1952)
SIPRE files, S-423, 1950/51

Monthly synoptic data with special reference to individual areas are given for the period from Oct. 1950-Sept. 1951. Sunshine duration, global radiation, air temperature, frequencies of wind directions and speeds, cloudiness, precipitation, snow depths and meltwater amounts are tabulated.

SIP U6781

In der Gand, H. R.
SNOW AND AVALANCHES IN THE PARSENN AREA. (Schnee und Lawinen im Parsenngebiet; Text in German). p.30-46 incl. tables, graphs, map. (In: Schnee und Lawinen im Winter 1950/51. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 15, 1952)
SIPRE files, S-423, 1950/51

Layer, ram, and temperature profiles were taken at the beginning and middle of each month. The development of the snow cover is traced in relation to weather conditions. The 3 periods differentiated are early, mid- and late winter, and are characterized by the formation of the foundation, growth of the snow cover, and the decay of the snow cover respectively. Uninterrupted snow-cover duration, snow depths and new-snow amounts are tabulated. The winter was characterized by considerable snowfall and avalanches. The accumulation of large snow masses within a short period was a special characteristic of the snow-cover formation.

SIP U6782

Schild, M.
SNOW CONDITIONS IN THE REMAINING SWISS ALPINE AREAS. (Die Schneeverhältnisse im übrigen schweizerischen Alpengebiet; Text in German). p.47-85 incl. tables, graphs, maps. (In: Schnee und Lawinen im Winter 1950/51. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 15, 1952)
SIPRE files, S-423, 1950/51

Snow-depth data are reported from the various stations comprising the network of avalanche service throughout Switzerland. Maximum and mean depths are compared and the water content of the snow cover is obtained. Early formation of a considerable snow cover, a long period of scant precipitation, and subsequent excessive precipitation led to the collapse of the snow-cover foundation with accompanying extensive avalanching. A list of avalanche bulletins issued by radio and press from Dec. 1, 1950-April 27, 1951 is included.

SIP U6783

Schild, M. and others
AVALANCHES IN THE SWISS ALPS DURING THE WINTER OF 1950/51. (Die Lawinen des Winters 1950/51 in den Schweizeralpen; Text in German). p.86-202 incl. illus. tables, graphs, maps, diagrs. (In: Schnee und Lawinen im Winter 1950/51. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 15, 1952)
SIPRE files, S-423, 1950/51

Avalanche catastrophes are discussed on the basis of tables, maps, and descriptions. The tables summarize all avalanches which led to damages with reference to the damages incurred. The avalanche maps indicate the course and location of each avalanche, and the descriptions include detailed accounts of victims' names, weather conditions at the time of the avalanche, and rescue methods.

SIP U6784

de Quervain, M. and M. Schild
EXPERIENCES AND CONCLUSIONS. (Erfahrungen und Schlussfolgerungen; Text in German). p.209-232 incl. illus. table, graphs, diagrs. (In: Schnee und Lawinen im Winter 1950/51. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 15, 1952). 3 refs.
SIPRE files, S-423, 1950/51

The catastrophic avalanches of 1950/51 are analyzed on the basis of the formation, local distribution and releasing factors of the avalanche. The extensive avalanche formation is attributed to extensive snow masses which fell within a short period. A theoretical analysis of the shear and pressure conditions within a snow cover on an incline shows that during a continuing snowfall, slopes above a certain inclination will tend increasingly more to avalanche forma-

tion whereas less steeper ones appear to become safer. The action and effects of ground and dust avalanches are discussed. The effectiveness of avalanche defenses, forests, and artificial release of avalanches is indicated, and the rescue service in the Davos area is outlined.

SIP U6785

Schild, M.
AVALANCHE DAMAGES OUTSIDE OF THE SWISS ALPS. (Lawinenschäden ausserhalb der Schweizeralpen; Text in German). p.223-224 incl. table. (In: Schnee und Lawinen im Winter 1950/51. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 15, 1952)
SIPRE files, S-423, 1950/51

Accidents, due to avalanches, which occurred in Austria, Italy, France, Norway, Sweden, Spain, and Peru are cited.

SIP U6786

REFERENCES TO FURTHER INVESTIGATIONS AND TASKS CARRIED OUT DURING THE WINTER 1950/51. (Hinweise auf weitere im Winter 1950/51 durchgeführte Untersuchungen und Arbeiten; Text in German). p.225-226. (In: Schnee und Lawinen im Winter 1950/51. Winterberichte des Eidg. Institutes für Schnee- und Lawinenforschung, Weissfluhjoch/Davos, Switzerland, No. 15, 1952). 3 refs.
SIPRE files, S-423, 1950/51

The relationship between the positive temperature sums and meltwater amounts was further investigated, and additional information was collected concerning the dependence of winter precipitation on elevation. Snow-pressure measurements were continued, and an installation based on the conic pressure method was erected to measure maximum pressures on avalanche-defense elements. Quantitative observations on the sliding of the snow cover on slopes exposed to the sun were made, and the effectiveness of pilings in preventing this movement was studied.

SIP U6787

Robinson, Elmer
AN INVESTIGATION OF THE ICE FOG PHENOMENA IN THE ALASKAN AREA. Rept. No. 6, Stanford Res. Inst. 26p. tables, diagrs. April 3, 1953. 12 refs.
DWB, Unclassed

The instrumentation and experimental techniques used by the field party included observations of ambient temperature and temperature differentials between surface and 2 m. and 2 m.-5 m., wiresonde temperature profiles, net radiation flux, visibility, collection of fog particles by settling, electrostatic precipitation, filtering and impaction. A method of determining humidities in the atmosphere using Karl Fisher reagent was developed and tested in the field. A Brown strip-chart recorder for temperatures and radiation was used.

SIP U6788

Nebol'sin, S.
SNOW MELTING. (Kak taet sneg; Text in Russian). Meteorologicheskiĭ Vestnik, 35:120-127 incl. tables, 1925.
DWB, M(05)R969me, v. 35

The physical properties of the snow cover were studied near Moscow during the winter of 1923-24. Snow density ranged from 0.14 (fresh, fluffy snow)-0.48 (end of snow melting). Snow-cover density increased with depth during the winter, but maximum densities were observed in the upper layers after thaw weather and during spring snow melting. Snow at depths of 5-10 cm. assumes the color of the spectrum near the E line on a sunny day. Temperature variations, diminishing with depth, were observed throughout the snow cover, but the melt processes penetrated only the upper 10 to 12-cm. layer in the early stages. Snow samples were placed in a room at a temperature below the f.p. for 4 months. The results indicated that evaporation did not occur without wind.

SIP U6789

Obolenskiĭ, Vl.
RADIOACTIVITY OF PRECIPITATION DETERMINED BY OBSERVATIONS OF COSMIC RADIATION IN THE ATMOSPHERE. (Radioaktivnost' osadkov po nabliudeniiam pronikaiushcheĭ radiatsii v atmosfere; Text in Russian). Meteorologicheskiĭ Vestnik, 29:7-22 incl. tables, graphs, diagr. 1919 10 refs.
DLC, QC851.M5, v. 29

The results of cosmic radiation measurements conducted at the Pavlovsk Observatory (near Leningrad) since 1915 are described and discussed. The measurements were made with an electrometer of high sensitivity (1 mm./0.1 ion of radiation) equipped with a photographic device. Radiation values increased during precipitation particularly during snow precipitation. A total of 222 records of snow precipitation showed increased cosmic radiation from 0.40 for heavy snowfall to 0.18 for light snowfall.

SIP U6790

Jakob, M. and S. Erk
THERMAL EXPANSION OF ICE BETWEEN 0° AND -253°C. (Wärmedehnung des Eises zwischen 0 und -253°; Text in German). Z. ges. Kälte-Ind. 35: 125-130 incl. tables, graphs, diagrs. 1928. 13 refs.
DA, 295.8Z3, v. 35

A dilatometer according to Henning is used. The ice rod, about 15 cm. long, stands in a quartz tube on a point of the same material. A quartz rod pointed at the lower end stands on the ice rod; on the upper

lateral end the quartz rod bears fine marks whose movement against similar marks on the quartz tube are measured microscopically. The whole apparatus stands in a glass tube filled with H_2. A maximum decrease in length of 6.5 mm. was observed at -200°C as based on a 1-m. long rod at 0°C. The expansion coefficient decreases from 52.7×10^6 at 0°C to 0.8×10^6 at -200°C. Then a change of sign occurs and it becomes -6.1×10^6 at -250 C. It is concluded that the majority of the hexagonal axes of the ice single crystals in the rods were vertical to the rod axis.

SIP U6791

TEMPERATURES OF SNOW AND SOIL SURFACES. (Sneen og jordbundens temperatur; Text in Norwegian). Naturen, 26:351-352, 1902. (Short notes)
DLC, Q4.N15, v. 26

The thermal conductivity of a loose snow cover is 10 times less that of sandy soil as measured by W. Bührer during 3 years of experimentation. The soil temperature at the surface was 2.4°C higher than in a 0.5-cm. snow cover. The insulating value of a snow cover increases with depth up to 20 cm. beyond which the thickness of a snow cover no longer influences the soil temperature at the surface. The surface soil temperatures under snow were 0.5°C and -4°C at air temperatures of -10°C and -18.6°C respectively.

SIP U6792

Mosby, Olav
ICE CONDITIONS IN THE NORTHWESTERN PART OF THE ATLANTIC OCEAN. (Isforholdene i den nordvestlige del av Atlanterhavet; Text in Norwegian). Naturen, 56:208-229 incl. illus. tables, graphs, maps, 1932.
DLC, Q4.N15, v. 56

The origin, drift and distribution of pack ice and icebergs are discussed. The sources of about 7000 icebergs from West Greenland are tabulated. Drift and temperature conditions in the Labrador Current are graphically presented as based on measurements of July 1931. The number of icebergs south of 48° N. lat. is tabulated for each month of 1900-1931 and shown in curves for 1880-1930. The correlation coefficient (0.85) between the number of icebergs and the magnitude of pack ice is explained and the influence of the atmospheric pressure gradient is discussed. The life cycle of icebergs including shape, height, depth in water, size and weight is described.

SIP U6793

HOW TO BLAST ICE JAMS. Eng. and Contr. 63: 489-490, March 1925.
DLC, TA201.E5, v. 63

Ice-jam blasting operations during spring breakups are described. The use of 30-40% gelatin dynamite and 40-50% nitroglycerin dynamite are recommended. The ice blaster works on the downstream of the jam sides so that the current carries away the loosened ice. Charges are distributed under the ice several hundred ft. below the jam and directly under the jam, and are fired simultaneously by means of electric blasting caps and a blasting machine. The quantity of dynamite for each charge depends on the thickness of the ice, the width of channel desired, and the proximity of buildings. Charges of 8-10 lb. dynamite should be used on ice 2-3 ft. thick and holes 30 ft. apart in rows 60-70 ft. apart.

SIP U6794

Dunin-Gorkavich, A. A.
GEOGRAPHICAL OUTLINE OF THE NORTHERN PART OF TOBOL'SK PROVINCE. (Geograficheskiĭ ocherk Tobol'skogo severa; Text in Russian). Izvestiâ Vsesoûznogo Geograficheskogo Obshchestva, 40:78-130, map, 1904.
DLC, G23.R6, v. 40

The province is located near the Arctic Ocean and is characterized by severe climatic conditions. The annual air temperature is below the f.p. (-3.0°C to -6.5°C) and winter lasts about 6 months. Air temperatures drop as low as -50.3°C. Winter precipitation is less than 10% of the annual amount and develops only a scanty snow cover. The Ob' River is open for navigation an average of 147-163 days. The dates of freeze-up varied between Oct. 11-Nov. 15, and spring breakup between April 28-June 20.

SIP U6795

Varnek, A. I.
ICE DISTRIBUTION AND NAVIGATION CONDITIONS IN THE SIBERIAN SEAWAY. (Raspredelenie l'dov i usloviâ plavaniâ na morskom puti v Sibir'; Text in Russian). Izvestiâ Vsesoûznogo Geograficheskogo Obshchestva, 38:306-341 incl. tables, map, 1902. 7 refs.
DLC, G23.R6, v. 38

A brief historical review of navigation conditions in the Siberian Arctic is given. The collected data show that the most frequent navigational difficulties are encountered in the Kara Sea and the Straits connecting it with the Arctic Ocean. Fresh water from many rivers reduces the salinity of sea water near the continent, and produces a longer and thicker ice cover near the coastline. Meteorological data collected at Novaya Zemlya since 1882 are tabulated and used to analyze navigational peculiarities. Ice cover conditions of the Kara and White seas and the western part of the Arctic Ocean in 1901 are shown on a map, and are compared with normals.

SIP U6796

Arnol'd-Alʃab'ev, V. I.
THE CHEMICAL NATURE OF ICE IN THE GULF OF FINLAND AS BASED ON ITS STRENGTH. (K voprosu o khimizme l'da Finskogo zaliva v svʃazi s izucheniem ego prochnosti; Text in Russian). Izvestiʃa Instituta Obshcheĭ i Neorganicheskoĭ Khimii, 6:229-233 incl. tables, 1933. 8 refs.
DLC, QD1.A38, v. 6

The relation between the chemical composition and the strength of ice was investigated. Ice retains some sea salts not only as mechanical inclusions but also in solution; the latter is a case of solid solution and shows a selective dissolving power for sulfates and carbonates and not for chlorides. Freezing sea water, at high concentrations, incapable of discharging excessive salt undissolved in ice occludes it mechanically in the space between the crystals and thereby impairs the strength of ice. The salinity of ice is increased by the speed of freezing; it is 3-16% in arctic sea ice and up to 30% in saline lakes, and is caused mostly by the mechanical inclusion of salts. The results of some pressure tests fail to indicate a direct relation between the low strength and high salinity of ice. Less saline samples of ice, in some cases, showed lower strength. (Chem. Abstracts)

SIP U6797

Zubov, N. N.
SOME CONSIDERATIONS ON ICE NAVIGATION IN THE POLAR BASIN. Hydrographic Rev. 10, No. 2: 224-232, 1933.
DLC, VK798.H8, v. 10

Polar ice is classified and defined as pack, floating and fast ice. Polar ice circulation is determined by the direction of the ocean currents which depend on air circulation, influx of river water and tends to the right due to the earth's rotation. Pack ice moves in a clockwise direction and floating ice in a counterclockwise direction. The Great Northern Polynya (lead) is formed at the contact line of the 2 currents, north of Spitsbergen, Franz Joseph Land, Severnaya Zemlya and Wrangel Island. The quantity of floating ice varies from year to year and is largely influenced by the temperature of the Atlantic and Pacific waters. Navigation is made possible by long-range forecasts, synoptic charts, bathometric charts and by attention to signs indicating nearby ice.

SIP U6798

Kapterev, P.
EXPERIMENTS IN THE REVITALIZATION OF ORGANISMS FROM THE PERMANENTLY FROZEN SUBSOIL. Compt. Rend. Acad. Sci. URSS, 3 (N. S.), No. 3:137-140, 1936.
DLC, Q60.A52, v. 3 (N. S.)

Experiments were conducted at the Skovorodino Station to determine the vitality of spores and eggs in permafrost. The permafrost and active layer were about 60 m. and 2.5 m. thick respectively and the average annual air temperature was -4° with a minimum of -49°C. The silt subsoil was highly saturated and varied little in temperature over an 8-yr. observation period. The subsoil temperature did not fall below -1.5°C at a depth of 3.2 m. and varied between -0.6° to -1°C at a depth of 5 m. Samples of frozen soil from various depths were examined for bacterial content. A total of 20 genera of algae and 1 species of lower crustaceans were identified at depths of 2.1-4.25 m.

SIP U6799

Kapterev, P.
NEW DATA ON REVITALIZATION OF ORGANISMS FROM PERPETUALLY FROZEN GROUNDS. Compt. Rend. Acad. Sci. URSS, 20,(N. S.), No. 4:315-317, 1938.
DLC, Q60.A52, v. 20 (N. S.)

Frozen samples were taken at the Bolshoy Never river valley where the permafrost and active layer were 60 m. and 2.5 m. thick respectively. Several buried humus horizons were discovered at a depth of 3-3.5 m. and a similar thin layer at 4.05 m. Well-preserved herbaceous plants and a condensed humus horizon were found at a depth of 9.2-9.7 m. and 10.2-10.7 m. respectively. The calculated age is about 400 yr. Approximately 50 genera of algae and some mosses were restored to life in 42 samples of frozen ground. The shallow layer flora did not exhibit any biological peculiarities. No N fixing, nitrifying, and monifying or cellulose bacteria were detected. Spore-bearing bacteria without proteolytic and pepticizing action were prevalent. These bacteria differed widely from those found in Central Russia. (See also SIP U6798)

SIP U6800

Veĭnberg, B. P.
THEORY OF RIME FORMATION. (K teorii obrazovaniʃa izmorozi; Text in Russian). Meteorologicheskiĭ Vestnik, 35:116-117, 1925. 1 ref.
DWB, M(05)R969me, v. 35

The conditions under which rime forms were observed in Detskoe Selo (near Leningrad) in 1925. The distribution of rime crystals over wires, fences and other objects indicated that rime formation is dependent on processes of adiabatic cooling of supersaturated air. The maximum deposit of rime occurred over places with maximum change of air flow speed.

SIP U6801

Gakkel', Ya. Ya.
ESTIMATING TRAFFICABILITY THROUGH THE ICE ON THE NORTH SEA ROUTE DURING NAVIGATION SEASONS 1933 AND 1935. (Opyt ocenki prokhodimosti l'dov na trasse Severnogo morskogo puti za navigatsiʃu 1933 i 1935 godov; Text in Russian with English summary). Problemy Arktiki, No. 1:81-101 incl. tables, graphs, 1937. 3 refs.
DLC, G600.P7, 1937

A quantitative method for estimating the polar ice trafficability along the North Sea Route is described. The ice trafficability was calculated from differences in the speed of S. S. Cheliuskin in 1933 and the S. S. Vanzetti in 1935 in open water and under given ice conditions. A relationship between the trafficability and quantity of ice was expressed by a 10-point system based on the average trafficability values for the 2 ships under different ice conditions. Mean trafficability values for the 2 vessels along various sections of the North Polar Route from Murmansk to Bering Strait are tabulated.

SIP U6802

Orvig, Svenn
THE GLACIOLOGICAL STUDIES OF THE BAFFIN ISLAND EXPEDITION, 1950. PART V: ON THE VARIATION OF THE SHEAR STRESS ON THE BED OF AN ICE CAP. J. Glaciology, 2:242-247 incl. tables, graphs, map, Nov. 1953. 8 refs. (Comments, by W. H. Ward, p.247-248)
DLC, Unbound periodical

Nye's formula for shear stress on a glacier bed was applied to the southern lobe of the Barnes Ice Cap. Data from 4 of the traverses, obtained in 1950, were used to calculate the variation of the shear stress on the bed. An ice density of 0.91 gm./cu. cm. was used in the calculations. Some of the values obtained are exceptionally low, possibly due to the fact that the lines of travel over the surface do not necessarily correspond to the lines of greatest slope or lines of flow. The values are relatively high in only one direction, and it is concluded that there is a considerably greater movement of the ice toward the northeast side of the southern lobe. The conclusion agrees with ground observations. Possible causes for the existence of relatively high values of the calculated bed shear stress on certain traverses, and of the greater rates of flow implied are suggested by W. H. Ward. (See also SIP U3149)

SIP U6803

Loewe, F.
GLACIOLOGICAL WORK IN TERRE ADÉLIE IN 1951. PRELIMINARY REPORT. J. Glaciology, 2: 248-249, Nov. 1953. 4 refs.
DLC, Unbound periodical

Accumulation and ablation, snow transport by wind, snow and firn densities and stratification, firn temperatures and hardness, and the heat economy of the snow surface were investigated. Preliminary data show that at least 50 tons of snow are carried from the icecap across each meter of the coast line. The surface deposits have a density of 0.4-0.5 and no marked increase was found to a depth of 3.5 m. The firn temperatures decrease very nearly by 1°C for a rise of the surface of the icecap of 100 m. This temperature is -33.5°C at a height of 1950 m. at the southernmost point.

SIP U6804

Benfield, A. E.
THE EFFECT OF ACCUMULATION ON TEMPERATURES WITHIN A SNOWFIELD. J. Glaciology, 2:250-254 incl. tables, graphs, Nov. 1953. 6 refs.
DLC, Unbound periodical

The results of calculations of the effect of accumulation on temperatures within a snow field as based on the magnitudes of the effect to be expected for specified conditions, at certain times of year and for different rates of accumulation are discussed. The subsurface temperatures were computed for constant velocities of accumulation at the rates of 0, 4 and 8 m./yr., and for the times 4, 7 and 10 months after the maximum temperature of the previous annual cycle occurred at the surface. Accumulation at the rate of 8 m./yr. has a greater effect in decreasing the subsurface temperature than the rate of 4 m./yr. The difference in subsurface temperatures, though relatively small for 4 months after the maximum surface temperature, is quite noticeable and significant for times of 7 and 10 months. (See also SIP U2213)

SIP U6805

Lliboutry, Louis
SNOW AND ICE IN THE MONTE FITZ ROY REGION (PATAGONIA). J. Glaciology, 2:255-261 incl. illus. map, diagrs. Nov. 1953. 6 refs.
DLC, Unbound periodical

The Fitz Roy district is subject to continual and strong west winds of high humidity. Glaciers descend to a low level. Ablation by rain plays an important part, and contributes to some surface features, such as thin vertical sheets of ice, hummocks and dirt cones. A new theory of the origin of dirt cones is given. The summits of aiguilles, always covered with glazed frost in the Fitz Roy area, are incrusted with heavy deposits of rime in the Cerro Torre and especially in the Cerro Grande areas. This forms huge cornices and feathered snow to leeward. (Author's abstract)

SIP U6806

Wilson, J. Warren
THE INITIATION OF DIRT CONES ON SNOW. J. Glaciology, 2:281-287 incl. table, graphs, diagrs. Nov. 1953. 7 refs.
DLC, Unbound periodical

Dirt cones on Jan Mayen Island, up to 10 cm. high and distributed at intervals of a few dm., were examined. The dirt cover of each cone was 1-3 cm. thick on top of the cone, but thinner on the sides. The sides of the cones sloped at an angle of about 60° with the horizontal. The cones develop where debris was blown on the snow and has become concentrated into numerous small patches thick enough to protect the underlying snow from ablation. The dirt accumulations are produced by contraction and expansion of the snow surface during ablation. A

thin layer of dirt increases ablation of the underlying snow, but a thick cover reduces the rate; the snow surface shrinks as ablation proceeds. It is concluded that a thin layer of dirt increases the shrinkage rate, but a thick layer reduces it. Factors controlling the movement of the snow surface during ablation produce local concentrations of dirt even when initial deposition of the dirt is almost uniform.

SIP U6807

Gold, Lorne W.
SNOW AND ICE RESEARCH ON THE NORTH AMERICAN CONTINENT. J. Glaciology, 2:292-294, Nov. 1953. 11 refs.
DLC, Unbound periodical

The work of representative organizations in the U. S. and Canada is described. Snow in the air is being studied by groups including the Geophysics Research Div. of the Air Force Cambridge Res. Center; Signal Corps Engineering Labs.; Mt. Wash. Observatory; Stormy Weather Group at McGill Univ.; National Res. Council and the Defence Res. Board of Canada. Extensive snow-cover surveys are made by the Assoc. Comm. on Soil and Snow Mechanics of the National Res. Council of Canada and by the U. S. Weather Bureau in cooperation with SIPRE. The physical properties of snow and ice are studied by SIPRE and the Snow and Ice Section of the National Res. Council of Canada. Many commercial organizations are involved in studies on ice (sliding on ice and snow, ice pressure on dams). Glacier research is conducted by the Arctic Inst. of N. Am., the Am. Geographical Soc. and the Defence Res. Board of Canada. A bibliographic search and abstracting service is being conducted by SIPRE.

SIP U6808

Loewe, F.
THE TERMS "NÉVÉ" AND "FIRN". J. Glaciology, 2:296-297, Nov. 1953. (Correspondence)
DLC, Unbound periodical

The definition of firn as suggested by the Committee on Snow Classification of the Intern. Assoc. of Sci. Hydrology is erroneous. Firn in the greater part of the world is not formed from snow as a result of frequent melting and freezing, but is transformed from snow into a dense heavy material by pressure and recrystallization only. Firn is characterized by the fact that the particles are to some extent cemented together, but that the air interstices still communicate with each other.

SIP U6809

Knopf, Eleanora B.
"PROCESSES OF ICE DEFORMATION WITHIN GLACIERS" BY THE LATE MAX HARRISON DEMOREST. J. Glaciology, 2:297, Nov. 1953. (Correspondence)
DLC, Unbound periodical

It is indicated that the recrystallization in ice induced by deformation in Demorest's experiments was so rapid as to be practically instantaneous. The process is recorded in motion pictures taken during the experiment. It is suggested that this instantaneous recrystallization was caused by the fact that the experiments were made at temperatures near the m.p. of ice. (See also SIP U6410)

SIP U6810

Sverdrup, H. U.
THE TEMPERATURE IN WEST-SPITZBERGEN'S GLACIERS. (Temperaturen i Vest-Spitsbergens breer; Text in Norwegian). Naturen, 59:239-248 incl. graphs, 1935.
DLC, Q4.N15, v. 59

The temperatures within glaciers were measured with thermoelements at Isachsen's Plateau. Temperatures decreased rapidly to a depth of 3 m. and increased slowly to 0°C at 10 m. The temperature distribution was attributed to the latent heat released by the freezing of surface meltwater (145 mm./sq. cm.) which penetrated the ice. This process tends to increase the density of the firn with depth. The average density within the upper 40 cm. of firn was computed from 5-day distribution curves of temperatures The computations, observations, and Ahlmann's findings are in good agreement. It is concluded that the glaciers of West Spitsbergen have the same temperature distribution as found on Isachsen's Plateau.

SIP U6811

Garrigue, Hubert
SCIENTIFIC EXPEDITION ... ON THE NORTH-WEST COAST OF GREENLAND, 1938-39. (L'expédition scientifique ... sur la côte nord-ouest du Groenland, 1938-39; Text in French). Météorologie, [16]:1-30, illus. tables, maps, diagrs. appendix, Jan.-June 1940. 26 refs.
DWB, M(05) S678mm, 1940-41

The temperatures on the Greenland Ice Cap were -15°[C] at 1.50 m. above the ground, -22°[C] at 0.30 m. above the ground with a snow surface temperature of -28°[C]. Radioactivity of the air trapped in the snow cover and in glaciers at 1 to 2-m. depths was measured and found negative. The snowhouse used as laboratory and living quarters is described. Temperatures at 0 and 2 m. above ground received by wireless from 3 stations and those taken at the snow station are tabulated. The radioactivity of the air in the coal mines of Krutlissat is discussed.

SIP U6812

MacDonald, W. A.
WATER WORKS FROST CONTROL. Can. Engr. 72, [No. 16 17]:43-47, April 27, 1937.
DLC, TA1.C2, v. 72

Frazil ice difficulties are minimized by constructing special sedimentation basins and applying live steam to screens. Settling basins are emptied by breaking the ice and flushing it down the drains. A new 48-in.

steel cylinder concrete pipeline across the Ottawa River was insulated by two 1.5-in. thick layers of rock cork over the expanded metal. The air space between the pipe and expanded metal was provided with steampipes. Thawing machines are used to heat water mains when frost penetrates to the depth of the mains and when tests indicate reduced pressure in hydrants. Tapping fire mains to sprinkler systems inside buildings, inspecting fire hydrants systematically and heating gate valves are recommended.

SIP U6813

Billings, Carl Henry
PROTECTING UNDERGROUND UTILITIES LOCATED IN ARCTIC REGIONS. Water & Sewage Works, 100, No. 11:441-447 incl. illus. table, diagrs. Nov. 1953. 7 refs.
DLC, TD1.W3, v. 100

The mechanics of permafrost are explained in terms of heat flow into and out of the ground during the freezing and thawing seasons, and the thermal conductivity values of ice and water. The effect of local thawing on underground structures depends on the character of the ground and its moisture content. The thawing of ice lenses in clay, silts, and loams causes cave-ins; the thawing of well-drained granular soils and frozen bedrock has no effect. Waste steam from turbines is distributed to buildings to be heated by means of underground pipes. Other utilities are protected by constructing underground conduits large enough to carry all the utilities. The heat given off by the steam mains is sufficient to maintain the utilidors well above freezing. The 2 types of recirculation systems for preventing water system freezing are described. Standard methods of venting sewer systems permit too much heat loss. Laminar flow is preferable in arctic sewers.

SIP U6814

Finsterwalder, Richard
THE DETERMINATION OF THE SNOW LIMIT AND ITS ADVANCE SINCE 1920. (Zur Bestimmung der Schneegrenze und ihrer Hebung seit 1920; Text in German). Sitzber. math. physik. Klasse bayer. Akad. Wiss. München, [1952]: 51-54 incl. tables, graph, 1953. 1 ref.
DLC, Unbound periodical

The snow limit of a stationary glacier may be determined by geodetic-meteorological methods, if a contour survey of the glacier and data on the snow depth at the elevation where ablation is zero, as well as data on the ablation in the tongue area are known. A parabola is assumed for the change of accumulation plus ablation with elevation. The snow limit is then determined in such a manner that the masses accumulating above it are equal to the masses melting below it. A quadratic equation is derived for the height of the intersection of the parabolic coordinates from which the snow limit can be found for that point on the parabola where accumulation and ablation are equal. The method was used to calculate the snow limit for the sum of 8 typical glaciers for 1920 and 1950. A rise in the limit of 64 m. was found. A value of 92 m. was obtained by applying the method to 2 stationary glaciers.

SIP U6815

D'Or, L.
THE PHYSICAL CHEMISTRY OF WATER ... (La physico-chimie de l'eau ...; Text in French). Trav. Centre d'Etude des Eaux. Univ. Liége, 3:7-58 incl. illus. tables, graphs, diagrs. 1945. 9 refs.
DLC, TD7.L5, v. 3

The composition, structure, thermal movements, dimensions, and stability of the water molecule are discussed. The thermodynamic properties, equations of state, thermal dissociations, and the spectroscopy of water vapor are analyzed. The structure of ice is interpreted on the basis of the molecular model. The variation of the dielectric constant of ice with frequency and temperature and the Raman spectrum of ice are plotted. A discussion of the boiling point, viscosity, surface tension, dielectric constant and spectroscopy of liquid water is included. Aqueous solutions of electrolytes and the fixing of water by solid substances are explained.

SIP U6816

Resvoll-Dieset, Hanna
CONCERNING SPITSBERGEN'S BOTANY. (Lidt om Spitsbergens plantevekst; Text in Norwegian). Norske Geografiske Selskabs Aarbog, 20:9-17 incl. illus. 1908-1909.
DLC, G25.N8, v. 20

The polygons in Miners Valley on Klaas Billen Bay (Spitsbergen) are 40 cm. in diam. and slope markedly toward the north and east. Vegetation is found only on the south and west sides of the polygons. These peculiarities are attributed to wind action. Fossil ice in Spitsbergen was first found in the Colbay Valley when a crevasse in the soil, 40 m. long, 5 m. deep and 3 m. wide, was investigated. The sides of the crevasse within 80 cm. of the top consisted largely of fossil ice.

SIP U6817

Pryde, J. A. and G. O. Jones
PROPERTIES OF VITREOUS WATER. Nature, 170: 685-688 incl. table, graphs, diagrs. Oct. 25, 1952. 31 refs.
DLC, Q1.N2, v. 170

Vitreous water was prepared by the method of deposition from water vapor and its thermal properties measured in calorimeters. Water forms a glass under favorable conditions with the transformation temperature lying between -150° and -125°C. It is implied that the increase in structural character of water with falling temperature must continue to a very marked extent as the temperature is decreased still further. The value of activation energy for viscous flow can exceed the heat of evaporation and the

strength of a single bond by a large factor. The specimens of glassy water containing varying proportions of crystalline ice complete their crystallization (apparently into ice I) precipitately when the temperature is raised to -129°C.

SIP U6818

Finsterwalder, R.
THE RESULT OF PHOTOGRAMMETRIC GLACIER MEASUREMENT SINCE 1885 IN THE EASTERN ALPS. (Das Ergebnis der photogrammetrischen Gletschermessung seit 1885 in den Ostalpen; Text in German). Allgem. Vermessungs-Nachr. No. 3:66-69, March 1, 1952. 1 ref.
DLC, TA501.A63, 1952

Photogrammetric glacier measurements made from 1885-1950 by various investigators were evaluated. Evaluations were made to determine the surface loss and the rise of the snow limit since 1920, the height changes and substance losses of glaciers since 1920, and the course of glacier recession since 1850. Mean surface loss values show that with increasing elevation the surface loss decreases systematically. A total mean value for the surface recession of 0.5% ± 0.1%/yr. was obtained for the 8 glaciers involved. The snow line rose from 2909.5 m. in 1920 to 2956.6 m. in 1950. The mean annual decrease in glacier height was 60 cm. or 33% of the annual precipitation amount. Glacier recession since 1850 occurred in 3 periods of varying intensity.

SIP U6819

Heald, Weldon F.
SIERRA SNOWS — PAST AND FUTURE. Sierra Club Bull. 34:55-67 incl. tables, graphs, June 1949. 19 refs.
DLC, F868.S5S5, v. 34

A study of seasonal snowfall records shows that a general decrease has occurred from the maximum snow depths of the 1890's. Graphs of seasonal snowfall for 1870-1948 are presented. Tentative predictions about Sierra snowfall for 1948-1968 are based on the past pattern of snowfall and California rains for the past 137 yr.

SIP U6820

Harrison, Arthur E.
ARE OUR GLACIERS ADVANCING?. Sierra Club Bull. 36, No. 5:78-81, May 1951. 5 refs.
DLC, F868.S5S5, v. 36

Evidence of glacial growth on several of the Sierra Nevada glaciers is presented. The growth is believed to be part of a new pattern of glacial behavior. Apparently a decrease in average temperature is the cause, which is limited to the region above a critical altitude closely related to the timber line in any locality.

SIP U6821

Roch, André
ON THE STUDY OF AVALANCHES. Sierra Club Bull. 36, No. 5:88-93 incl. diagrs. May 1951. 6 refs.
DLC, F868.S5S5, v. 36

The mechanism of sliding and rupture of avalanches, and how the degree of danger can be determined are explained. A loose-snow avalanche is produced when the grains in the delicate structure of a snow layer are unbalanced by a disturbance, by metamorphism or by high temperature which produces a wet snow-slide. A slab avalanche ruptures when the creeping velocity is changed and the stresses in the snow layer are altered. Rupture occurs when the stress equals the breaking resistance of the snow, and the slab slides down the slope. Snow creep is a function of plasticity, slope inclination, weight of the layer and friction on the ground or on another snow layer. A mathematical analysis is made of the variations in snow-slab stress and resistance to breaking of the slab. A sample stability computation is presented. The rupture of a slab may be forecast if the shearing strength of the weakest layer and the rate of snowfall are known.

SIP U6822

Lenherr, F. E.
DEVELOPMENT OF SPRAY SYSTEM RADOME ANTI-ICING. Final Rept. No. TDM-68-III, Northrop Aircraft, Inc. 124p. incl. illus. tables, graphs, diagrs. appendices I-VI, Jan. 15, 1953. 21 refs. (Contract No. AF 33[038]-1817)
ASTIA, AD 11981

Water, ethylene glycol and methyl alcohol were tested to ascertain their effects on aircraft nose radomes. The anti- and de-icing effectiveness of the spray-type system used, and the distribution of icing cloud-water droplet impingement was studied. Wind tunnel tests were conducted to determine the distribution of the ethylene-glycol solution on the radome surface. The effect of ice formations on the radome on the transmission efficiency of the radar equipment was investigated. Available information indicates the feasibility of the ethylene-glycol spray system from both the ice prevention and electrical operation standpoint.

SIP U6823

Wegmann, Eugène
THREE PHASES OF ARCTIC EXPLORATION. (Trois phases de l'exploration arctique; Text in French with German and English summaries). Bull. Soc. Neuchateloise Sci. Naturelles, 74:107-122, 1951. 4½ refs.
DLC, Q67.N44, v. 74

Three phases are distinguished in the development of polar exploration. The coast lines and the physiography of the lands, the limits of the seas and ice coverings are determined through cruises. Moving masses of sea water, air currents, icecaps and sea

ice are investigated through velocity and balance measurements. The nature of arctic lands is studied through interpretation of remains of the geological past.

SIP U6824

Pataleev, A. V. and S. ſA. Bozhenkov
FOUNDATIONS IN PERMAFROST. (Fundamenty v usloviſàkh vechnoĭ merzloty; Text in Russian). p.464-505 incl. tables, graphs, map, diagrs. (In: Mekhanika Gruntov, Osnovaniſà i Fundamenty, Pt. 2, Moscow, Transzheldorizdat, 1943)
DLC, TA775.P172, 1943

Permafrost phenomena are defined and hydrological and mechanical peculiarities discussed. The depth and relief of the upper permafrost table, type and thickness of permafrost, influence of ice inclusions and dynamic processes in the action layer are discussed. Causes of deformation and principles for the foundation design of buildings, bridge supports, and pipe laying in permafrost are descirbed. Methods of calculating constructions are given based on compressive and bending strength and friction resistance to heaving. Instructions for boring operations and bench marking are included.

SIP U6825

Keller, Chas.
THE ICE PROBLEM IN CANADA ... Military Engr. 13:104-105, March-April 1921.
DLC, TA1.P85, v. 13

Extracts from an address by John Murphy are presented. Anchor and frazil ice are defined and their mode of formation is explained. Canadian ice problems include the necessity of keeping hydraulic apparatus free of ice, and preventing the blockading of streams by ice. Hydraulic apparatus is kept free from frazil ice by introducing a small amount of heat to keep the machinery 0.001 part of a degree above the f.p.

SIP U6826

Brun, Edmond and Max Plan
THE FORMATION OF FOGS FROM WATER SUPERCOOLED AT VERY LOW TEMPERATURES. (Sur la formation de brouillards d'eau surfondue à de très basses températures; Text in French). Compt. Rend. 223:351-352, Aug. 19, 1946. 1 ref.
DLC, Q46.A14, v. 223

The fog was observed during measurements made in a supersonic wind tunnel, and consisted of water droplets less than 0-1 μ in diam. Rime forms from the fog under certain exterior conditions of temperature and relative humidity. It is concluded that condensation in very cold air may take place in the form of water and, the liquid state may exist at temperatures below -100°C for very fine droplets.

SIP U6827

Morozov, N. D.
CONSTRUCTION OF STONE SUPPORTS IN PERMAFROST. (Ustroĭstvo kamennykh opor v usloviſàkh vechnoĭ merzloty; Text in Russian). Transportnoe Stroitel'stvo, 3, No. 7:32-34 incl. diagrs. 1933. 1 ref.
DLC, HE7.T7, v. 3

Methods used to protect bridge supports include the use of backfills of insulating material, porous concrete, wooden-beam foundations and shading from solar radiation of protruding parts. Piles of reinforced concrete are sunk in permafrost in the autumn. Formulas are given for pile depth and load in permafrost.

SIP U6828

Shipchinskiĭ, A. V. and N. A. Drugova
CLIMATE OF THE VORONEZH EXPERIMENTAĹ FIELD ACCORDING TO OBSERVATIONS DURING 1912-1925. (Klimat Voronezhskogo opytnogo polſà po nablſùdeniſàm s 1912 po 1925 god; Text in Russian). Zapiski Sredne-Chernozemnogo Meteorologicheskogo Bſùro (Voronezh), 1:21-73 incl. tables, graph, diagrs. 1928. 3 refs.
DLC, Slavic unclassified

Climatic data are tabulated and discussed. Snowfalls were observed on an average of 56 days during Oct.-May with a maximum number of 13.6 days in Jan. Snowstorms occurred on an average of 23.1 days during Oct.-April. Rime was observed on 22.2 days from Sept.-April with maxima of 4-5 days occurring in Feb. and Dec. Glaze formation was observed annually on 4.1 days (Oct.-April) with a maximum of 1.1 days in Dec.

SIP U6829

Grob, Werner
SOME THOUGHTS ABOUT AVALANCHES. Sierra Club Bull. 35:91-96, June 1950.
DLC, F868.S5S5, v. 35

The Alta Avalanche Studies by Atwater and Koziol, and Report on Snow and Avalanche Conditions in the U. S. Western Ski Resorts by Roch are reviewed and discussed. An avalanche-warning service in the U.S. and training Forest Service personnel in Switzerland are advocated. Grob believes that the value of the ram sonde is underrated by Atwater and Koziol.

SIP U6830

[Sieker, John and others]
LETTERS TO THE EDITOR ON AVALANCHES. Sierra Club Bull. 35:97-101, June 1950.
DLC, F868.S5S5, v. 35

Various statments made by Grob in his review of The Alta Avalanche Studies are criticized by Sieker, Atwater and Koziol. The approach and solution to the avalanche problem in the U. S. and Switzerland

differs considerably. It is felt that an avalanche-warning service in the U. S. is adequate only on a localized basis. The use of the ram sonde is not underrated by Atwater and Koziol, but on the basis of their experience they cannot agree that a single ram profile is valid for an entire locality. Grob indicates that one ram profile per ski area suffices since the history of the snow layer and temperature will be the same for the entire area. (See also SIP U6829)

SIP U6831

Holmsen, Gunnar
OUTLINE OF SPITSBERGEN'S GEOLOGY. (Lidt om Spitsbergens geologi; Text in Norwegian). Norske Geografiske Selskabs Aarbog, 20:1-8, 1908-1909.
DLC, G25.N8, v. 20

The central part of Spitsbergen is covered with ice several hundred meters thick on which glaciers move at about 2 m./day. The Seftetröm's Glacier moved 6 km. (1882-1896) and covered an additional 33 sq. km. as it increased 100 m. in thickness; the glacier had retreated several km. by 1908. Steep mountainsides are littered with debris and rocks resulting from water freezing in cracks and crevasses. The floors of the valleys consist of gravel, sand and clay dried and cracked to form polygons from a few dm. up to 10-12 m. in diam.

SIP U6832

Magono, Chōji
ON THE GROWTH OF SNOW FLAKE AND GRAUPEL. Sci. Repts. Yokohama Natl. Univ. Sect. I, No. 2:18-40 incl. illus. tables, graphs, diagrs. March 1953. 13 refs.
SIPRE files, S-1478-II

A quantitative investigation of the growth of snowflakes and graupel by the accretion process was made to determine the principal mechanisms for raindrop formation. A stroboscopic camera was used to measure the fall velocities and to observe the shapes of single snow crystals and small snowflakes. The fall velocity of large snowflakes was measured by a stop watch. The measurements show that the fall velocity of large snowflakes is greater than that of single snow crystals of the same crystal type, and that the fall velocity of snowflakes larger than 2 cm. is almost independent of their sizes. Snowflakes grow by the collison of snowflakes with snow crystals due to their different fall velocities. Quantitative estimates of the rate of growth of snowflakes indicate that a sizable raindrop may be produced from a snowflake. The formation of graupel is discussed and the increase in graupel volume due to collision with cloud particles is calculated.

SIP U6833

Geslin, H.
SOIL TEMPERATURE. (La température du sol; Text in French). Météorologie, 11:5-26 incl. tables, graphs, diagrs. 1935. 36 refs.
DWB, M(05) S678mm, v. 11

Temperature variations as a function of solar and nocturnal radiation at the soil surface, and the laws of heat propagation in the soil are analyzed. Natural influences and the physical state of soil are discussed. Soil freezing, frost penetration, frost action on the structure and texture of the soil, including aggregate and dispersive action, soil heaving and the influence of freezing on the distribution of ground water are discussed. A discussion of frost action as an agronomic factor in loosening and crumbling the soil is included.

SIP U6834

Baldit, Albert
SPECIAL INSTALLATION OF THE ASSOCIATION RAIN GAGE FOR MELTING SNOW AT THE GAGE SITE. (Dispositif spécial du pluviomètre Association destiné a la fusion, sur place, de la neige; Text in French). Météorologie, 11:32-38 incl. illus. diagrs. 1935.
DWB, M(05) S678mm, v. 11

A precipitation gage is described. The gage is enclosed in a jacket into which warm water may be poured for melting the snow and making water-equivalent measurements.

SIP U6835

Martin, Ed.
RELATIVE IMPORTANCE OF SNOWFALL IN SAVOY. (Importance relative des chutes de neige en Savoie; Text in French). Météorologie, 11:117-121 incl. tables, March 1935.
DWB, M(05) S678mm, v. 11

The relative importance of snow and rain is calculated for the 4 geographical regions of Savoy. The calculations are based on the increase of precipitation with each 500 ft. elevation, the surface of the areas included between these levels, and the variation of the snow-to-rain ratio with elevation. Snow contributes 17, 35, 64, and 67% of the run-off in the foothills, the Savoy coomb, the Tarentaise and the Maurienne respectively or an average of 55% for the entire area.

SIP U6836

Viaut, A. and J. Guiraud
RIME AND GLAZE. (Givre et verglas; Text in French). Météorologie, 11:243-248 incl. diagr. May 1935.
DWB, M(05) S678mm, v. 11

Rime and glaze are defined and the principal causes of temporary and persistent icing are discussed. Icing danger in France and at similar latitudes is likely in the mountains at all seasons and in the plains during the cold season. Temperatures between 0° and -5°[C] are most conducive to icing. A systematic study of the meteorological situation and its evolution including humidity at different altitudes and the height of the 0°[C] isotherm must be made before each trip.

SIP U6837

Gain, L.
FLOATING ICE. (Les glaces flottantes; Text in French). Météorologie, 11:400-415, illus. 1935. 1 ref.
DWB, M(05) S678mm, v. 11

The salinity of sea water and the formation of sea ice are discussed. The principal types of floating ice are described and defined, including fast and land ice, icebergs, and barriers. An outline of a code for drafting observations concerning the state of sea ice is presented.

SIP U6838

Mironovitch, and A. Viaut
ICING RISKS IN RELATION TO WEATHER TYPES. (Du risque de givrage en fonction des types de temps; Text in French). Météorologie, 11:498-503 incl. table, maps, Nov. 1935.
DWB, M(05) S678mm, v. 11

A total of 48 cases of airplane icing occurring near Reims (France) from Oct. 1934-April 1935 were analyzed. Air masses were moving in from the northwest, northeast, west, southwest, and southeast in 31, 19, 21, 19, and 10% of the cases respectively. The presence of a front is necessary but not sufficient to produce icing. Icing is more prevalent on the descent than on the ascent of a plane.

SIP U6839

Mougin, P.
SNOW MEASUREMENT. (La Nivométrie; Text in French). Météorologie, 3:254-268 incl. illus. diagrs. 1927. 4 refs.
DWB, M(05) S678mm, v. 3

Methods and apparatus for measuring snow are described. Included are the snow board, Hellmann snow sampler, Angot's basket nivometer, Billwiller shielded rain gage, and Mougin totalizer. A comparison is made of the results obtained with various methods.

SIP U6840

Shelesnyak, M. C.
ACROSS THE TOP OF THE WORLD. A DISCUSSION OF THE ARCTIC. Office of Naval Research, 71p. incl. illus. Aug. 1947. 9 refs.
DLC, G615.U5, 1947

The terrain and general physical characteristics of geographical areas within the arctic are described. Life in the arctic is depicted, and the essential role of special knowledge in adaptation to the environment is emphasized. The Arctic Research Program of the Office of Naval Research is outlined. The bibliography of about 225 books, prepared by V. Stefansson, is suggested as a nucleus of an arctic library. The bibliography contains a number of annotations.

SIP U6841

de Quervain, M.
THE ORIGIN OF AVALANCHES. (Zur Entstehung der Lawinen; Text in German). Leben u. Umwelt, 7: 121-131 incl. illus. graphs, diagrs. 1951. (Reprint)
SIPRE files, S-1444

Snow weight, tensile- and shear strength, friction, elasticity and plasticity, and snow metamorphism are briefly discussed in reference to avalanche formation. The formation of loose-snow and snow-slab avalanches is described. The determination of avalanche danger on the basis of snow quality, distribution and terrain configuration is outlined.

SIP U6842

Øyen, P. A.
A GLACIER CAVE. (En isbraegrotte; Text in Norwegian). Naturen, 34:190-191 incl. illus. 1910.
DLC, Q4.N15, v. 34

The cave under the Böver Glacier in Jotunheimen was about 10 m. high, 15 m. wide and about 50 m. long. The characteristic glacier-band structure was visible on the walls. The air temperature in the cave was 1°C, and 2.9°C outside.

SIP U6843

Sverdrup, H. U.
SCIENTIFIC WORK OF THE "MAUD" EXPEDITION 1922-1925. ("Maud" ekspeditionens videnskabelige arbeide 1922-1925; Text in Norwegian). Naturen, 50: 161-180 incl. graphs, maps, 1926.
DLC, Q4.N15, v. 50

Various aspects of the work are discussed including Malmgren's investigations of the properties of sea ice. Newly frozen sea ice is pure ice with cavities containing brine which interchanges with the ice with a change in temperature. The intensity of this interchange controls the expansion, contraction and the specific heat of the ice, and is responsible for the upper ice becoming fresh. Measurements of brine concentration agreed well with theoretical estimates. (See also SIP U569)

SIP U6844

Eriksen, Arne
PHYSICAL AND TECHNICAL ASPECTS OF THE GROUND FROST PROBLEM. (Teleproblemet, dets fysikalske og tekniske side; Text in Norwegian). Naturen, 64:353-364 incl. illus. diagrs. 1940.
DLC, Q4.N15, v. 64

Frost heaving on highways, railroads and building constructions is discussed, and notes on research by Beskow and Taber are included. Countermeasures comprise selection of particle size (above 0.1 mm.), mass materials replacement, surfacing and drainage. Most heat loss occurs in freezing of water rather than cooling of the soil which explains why frost penetra-

tion decreases with increasing water content. Frost penetration in Norway may vary from 30 to 140 cm. Independent Norwegian research is suggested.

SIP U6845

Edlund, O.
SNOW GARLANDS. (Sneguirlander; Text in Norwegian). Naturen, 47:59-60 incl. illus. diagr. 1923.
DLC, Q4.N15, v. 47

The development of a heavy snow garland on a wooden picket fence is described and the local meteorological conditions are given. The formation of overhanging snow on a 15-cm. wide board was studied and may be compared with the formation of overhanging snowdrifts. Regelation within the snow mass is responsible for these phenomena.

SIP U6846

Kyriazopoulos, B. and G. Marinos
CONTRIBUTION OF THE STUDY OF HOARFROST. (Contribution à l'étude du phénomène de la gelée blanche; Text in French). Praktika Akad. Athenon, 13:496-505, illus. diagr. 1938. 15 refs.
DLC, AS202.A35, v. 13

Hoarfrost crystals formed on glossy paper covered with soot were examined with a microscope. More or less regular hexagonal and square imprints generally less than 0.01 mm. in size were apparent. The relative amounts of squares and hexagons vary. The hexagons are generally more numerous but occasionally a larger amount of squares occurs. The possible influence of the crystallization medium on crystal shape is mentioned.

SIP U6847

Rogachev, I. M.
PROBLEM OF ICE TRAFFICABILITY FOR VESSELS. (K voprosu o prokhodimosti l'dov dlîa sudov; Text in Russian). Severnyĭ Morskoĭ Put', 11:52-55 incl. tables, 1939. 2 refs.
DLC, GB651.S4, v. 11

The inverse relationship between decreased vessel speed and the quantity of polar ice and the 10-point scale of ice trafficability are regarded as inaccurate. The tables given indicate this inaccuracy. The loss in vessel speed will differ somewhat through identical ice quantities according to the path a vessel travels. The direct proportional effect of visibility in fog on ice trafficability is also disputed. (See also SIP U6801)

SIP U6848

Buchanan, J. Y.
THE SIZE OF THE ICE-GRAIN IN GLACIERS. Nature, 64:399-400 incl. tables, Aug. 22, 1901. (Letters to the editor)
DLC, Q1.N2, v. 64

Fragments of Aletsch glacier ice were dissected into their component grains to ascertain their weight and size. Large, single grains of 100-700 gm. were obtained; smaller grains weighed from 1.5-90 gm. Attempts were made to determine the number of large and small grains in each glacier block. The records are fairly complete for 2 blocks. The sun's rays decompose glacier ice into its constituent grains and split individual grains into laminae perpendicular to the principal axis of the crystal and bounded by planes of fusion. The separation into grains is thorough near the surface, but does not penetrate very deeply. The sun's rays separate lake ice into vertical columns which correspond to grains in glacier ice.

SIP U6849

Ahlmann, Hans W:son
GLACIERS AND THEIR GEOGRAPHICAL SIGNIFICANCE. (Glaciärerna och deras geografiska betydelse; Text in Swedish). Ymer, 49:325-339 incl. illus. 1929.
DLC, GN1.Y5, v. 49

Ablation from the surface of the lower part of the Styggedals Glacier (Jotunheimen, Norway) amounts to 1 mm./hr. on overcast days at a temperature of 4°C, and 5000 cu.m./hr. from the entire glacier. On clear days at 16°C values of 4 mm./hr. and 10,000 cu.m./hr. respectively are increased to 9 mm./hr. and 15,000 cu.m./hr. by foehns. The influence of glaciers and ice masses on climate, and the erosion related to geological features are outlined.

SIP U6850

Ačhevskiĭ, L. A.
THE STUDY OF CONDITIONS OF ANCHOR ICE FORMATION. (Materialy po voprosu ob izuchenii usloviĭ obrazovaniîa donnogo l'da; Text in Russian). Gidrologicheskiĭ Vestnik (Leningrad), 1:69-118 incl. illus. tables, graphs, diagrs. 1915. 5 refs.
DLC, GB651.G4, v. 1

Weather conditions accompanying freezing of the Neva River and the appearance of anchor ice during 1908-1914 are discussed. Thermal and cloudiness data are tabulated. Temperature measurements at various depths under the ice cover are analyzed. Water cooling processes are important to anchor ice formation. These processes were studied during the summer of 1915. Investigations showed that anchor ice forms on submerged supercooled objects. Anchor ice may form on supercooled surfaces even though the water is not supercooled.

SIP U6851

Artsybashev, S.
MEASUREMENTS OF SUBSURFACE TEMPERATURES BY THERMOCOUPLES AND SOME OBSERVATIONS OF THE ANGARA RIVER WINTER TEMPERATURES. (Izmerenie glubinnykh temperatur s pomoshch'iu termostolbika i neskol'ko nabliudenii nad zimnimi temperaturami Angary; Text in Russian). Meteorologicheskii Vestnik, 35:30-31, 1925.
DWB, M(05) R969me, v. 35

A set of 20 iron-nickeline thermocouples connected with a mirror galvanometer was used to measure temperature in the Angara River. The accuracy of the readings varied between 0.00001°-0.00005°C depending on the wind velocity. Anchor ice and supercooled water were observed at depths of 1-1.5 m. before an ice cover formed. Anchor ice formation ceased with the appearance of frazil ice. The fluctuations in water temperatures before an ice cover formed indicated intensive water mixing.

SIP U6852

Abel's, G.
SHIELDS FOR RAIN GAGES. (O zashchitakh dlia dozhdemerov; Text in Russian). Meteorologicheskii Vestnik, 35:113-115 incl. table, 1925.
DWB, M(05) R969me, v. 35

Wind conditions in and around a standard gage equipped with a Nipher shield and a gage with a wooden fence, 5 x 5 x 2 m., were studied at the Sverdlovsk Observatory during 1918-1920. Eddies originating in and around the standard gage produced considerable loss of snow from the gage during snowstorms. The snowdrifts in front of the fence and the snow deposits in the gage showed that the fence prevents snow loss due to wind, but eddies can drift a large amount of snow from snow-covered surfaces into the gage.

SIP U6853

Stroner, R.
HIGHWAY MAINTENANCE. (Udržování silnic; Text in Czech). Silniční Obzor (Bratislava), 26:132-136, Sept. 1950.
DLC, Unbound periodical

Problems of highway snow removal by V-, wing and rotary snowplows and the organization of sanding operations on icy roads are discussed. Fifteen km. of icy road were serviced per hr. with a spreader using 8 cu. m. of slag or cinders. Winter highway maintenance in Czechoslovakia is being mechanized except for snow-fence protection.

SIP U6854

Puzanov, V. P. and V. I. Akkuratov
FORMATION OF HAILSTONES. (K voprosu o mekhanizme obrazovaniia nekotorykh vidov gradin; Text in Russian). Meteorologiia i Gidrologiia, No. 6:29-33 incl. illus. 1952. 11 refs.
DLC, QC851.M27, 1952

Laboratory experiments on water freezing were conducted during many winters to study the nature of hailstone formation. The water was first frozen in spherical 500-cc. flasks at temperatures ranging from -5° to -16°C. Complete freezing occurred only at temperatures above -10°C. The ice cover ruptured, releasing unfrozen water, at temperatures below -10°C. The same reaction occurred when water droplets, 2-4 mm. in diam., were frozen in kerosene. The spherical form of the droplets was distorted during freezing and deformations like those observed in hailstones occurred. The droplets lost their transparency upon complete freezing. The frozen droplets contained air bubbles and fissures.

SIP U6855

Tol'skii, A.
MEASUREMENTS OF HOARFROST AND RIME AT METEOROLOGICAL STATIONS. (K voprosu ob izmerenii ineia i izmorozi na meteorologicheskikh stantsiiakh; Text in Russian). Meteorologicheskii Vestnik, 36:185-190 incl. tables, 1926.
DLC, QC851.M5, v. 36

Investigations at Bogoroditskoe-Fenino (Kursk province) indicated that the best collectors of rime, dew, fog, and other hydrometeors are metallic or wooden rods, 3-5 mm. in diam. placed vertically or horizontally. The dependence of rime deposit on the diam. of the receiver was confirmed at the Borovoe Experimental Forestry Station (Samara province) where rime and hoarfrost quantities have been measured since 1908. Wooden plates, 20 x 25 cm. in size, and thin rods were used as collectors. The rods collected about twice as much ice by weight as the plates. Monthly data on rime and hoarfrost deposits for the period 1908-1915 are tabulated.

SIP U6856

Aderkas, O.
INFLUENCE OF RAIN GAGE INSTALLATION AND WIND VELOCITY ON THE AMOUNT OF MEASURED PRECIPITATION. (Vliianie ustanovki dozhdemerov i sily vetra na kolichestvo izmeriaemykh osadkov; Text in Russian). Meteorologicheskii Vestnik, 36:191-196 incl. tables, 1926. 3 refs.
DLC, QC851.M5, v. 36

The study was conducted at the Meteorological Observatory of the Forest Institute (Leningrad) for 4 yr. Measurements made with a standard gage, one installed on the observatory tower (28 m. high), and a shielded gage were compared. The differences between the measurements were not more than 17% for liquid precipitation, but the unshielded tower installation collected an average of 3.08 times less snow precipitation than the standard gage. Differences in solid precipitation catch as related to intensity and wind velocity are tabulated.

SIP U6857

Skorobogat'ko, V.
AMOUNT OF WINTER PRECIPITATION OBTAINED FROM RAIN GAGE MEASUREMENT AND FROM DETERMINATION OF WATER CONTENT OF THE SNOW COVER. (O kolichestve zimnikh osadkov po dozhdemeru i po zapasu vlagi v snezhnom pokrove; Te[illegible] in Russian). Meteorologicheskiĭ Vestnik, 37: 100-107 incl. tables, 1927. 8 refs.
DLC, QC851.M5, v. 37

Data of winter precipitation, snow-cover depth and density observed at the Kostychevskaya Experimental Station during 1905-1925 are tabulated and discussed. Snow cover formed between Oct. 31-Jan. 9 and disappeared between Feb. 18-April 16. Snow covered the area an average of 103-133 days and reached a maximum depth of 20-30 cm. and a density of 0.21-0.35 in Feb.-March. The water equivalent of the snow cover was compared with gage data. The results indicated that the gage collected only an average of 55% of the winter precipitation. Comparisons made at Temir and Kuznetsk experimental fields under approximately the same wind conditions indicated a 58% catchment.

SIP U6858

Skorobogat'ko, V.
ACCURACY OF WINTER PRECIPITATION MEASUREMENTS BY RAIN GAGE. (K voprosu o tochnosti izmereniĭa zimnikh osadkov dozhdemerom; Text in Russian). Meteorologicheskiĭ Vestnik, 37:253 incl. table, 1927. 2 refs.
DLC, QC851.M5, v. 37

Data of winter precipitation measurements during 1916-1927 at Kostychevskaya Experimental Station were compared. The correlation coefficient between the percent of winter precipitation measured by the gage and the percent of windy days equaled -0.66.

SIP U6859

Robitzsch, M.
SNOW CRYSTAL FORMS. (Die Formen der Schneekristalle; Text in German). Z. angew. Meteorologie, 59:237-250, 1942. 1 ref.
DWB, P Z48a, v. 59

Equations are derived to determine the conditions which must be fulfilled when a water droplet or an ice particle exists in a stationary state of equilibrium in air of specific temperature and humidity. The amount of water or ice condensed or evaporated on individual surface elements of a precipitation particle is dependent on the shape and exposure of the particle to the ventilating current. Maximum growth or loss occurs on the tips and edges of ice crystals falling through the atmosphere because of ventilation and vapor pressure gradients. The form of a snow crystal reveals the moisture conditions of the air layers which the crystal traversed during formation. Snow crystals rotate while falling, and the ventilation speed of the crystal is greatest at the edge in relation to the surrounding air, causing preferential growth in the crystal's own plane.

SIP U6860

Czepa, Otto
A CONTRIBUTION TO SNOW RESEARCH. (Ein Beitrag zur Schneeforschung; Text in German). Z. angew. Meteorologie, 59:251-258 incl. illus. diagrs. 1942. 3 refs.
DWB, P Z48a, v. 59

A snow-crystal classification, based on Pernter's classification, and emphasizing crystal form is presented. The classification is divided into 3 main groups: (1) predominant development in the direction of the main axis, (2) combination of prisms and plates, and (3) main development in the direction of the secondary axes. Group 1 is subdivided into prisms observed between -23° to -15°C and 0.35 - 0.5 mm. in diam. and needles up to 10 mm.; group 3 includes full crystals in the range -23° to -13.5°C, weak, average and strong progressive formations.

SIP U6861

Shuleĭkin, G. V.
ANTENNA HEATING FOR GLAZE DAMAGE PREVENTION. (Progrev antenn dlĭa bor'by s gololedom; Text in Russian). Elektrosvĭaz', 9, No. 2:38-43 incl. graphs, diagrs. 1941.
DLC, TK4.E744, v. 9

The electric power needed for removing glaze from radio antennas was calculated. It is necessary only to melt the glaze layer next to the wire to remove the glaze. Heating the antenna to 2°-7°C is the best method of glaze prevention.

SIP U6862

Kretovich, E. L.
INSTALLATION OF COMMUNICATION LINE POLES IN PERMAFROST REGIONS. (Ustanovka opor vozdushnykh liniĭ svĭazi v raĭonakh vechnoĭ merzloty; Text in Russian). Elektrosvĭaz', 9, No. 3:71-72 incl. diagrs. 1941.
DLC, TK4.E744, v. 9

Frost heaving of poles is common in permafrost regions. Four systems of pole installation are recommended for preventing this damage. Foundations are placed in the active layer, in permafrost to a depth equal to twice the depth of the active layer, on top of the ground and braced with wooden poles, or in log casings holding stones. One-m. high mounds of peat or stone are placed around the poles set in the active layer.

SIP U6863

Thuman, William C. and Elmer Robinson
A TECHNIQUE FOR THE DETERMINATION OF WATER IN AIR AT TEMPERATURES BELOW FREEZING. Rept. No. 9, Sci. Rept. No. I, Standard Res. Inst. 14p. incl. tables, graph, diagrs. Sept. 28, 1953. 6 refs.
DWB, Unclassed

A field sampling technique for determining the water content of the atmosphere at temperatures between -12° to -32°C was developed. The method consists of extracting the water by bubbling air through absolute methanol, an aliquot of which was then titrated with Karl Fischer reagent. A visual endpoint was applicable. The method permits rapid titration, simple apparatus, and measures directly to within 2% of the absolute values. A method of filtering the air in order to separate water vapor from precipitated water was developed for sub-freezing temperatures.

SIP U6864

Robinson, Elmer
AN INVESTIGATION OF THE ICE FOG PHENOMENA IN THE ALASKAN AREA. Rept. No. 2, Stanford Res. Inst. 16p. illus. graphs, diagr. March 31, 1952. 6 refs.
DWB, Unclassed

Only 1 short instance of ice fog was observed during the report period Dec. 21, 1951-March 31, 1952. Observations of wind conditions were made with 2 Beckman & Whitley Climate Survey Systems capable of measuring wind direction and speed at speeds less than 1 m.p.h. Temperature measurements through the lowest few hundred ft. of the atmosphere were made with a wiresonde. Samples of ice crystals were taken by allowing them to settle on glass microscope slides coated with a Formvar solution. Examination of the crystal replicas showed a size range of between 10 to 120-μ diam. Small columnar forms, large columns and large hexagonal plates predominated.

SIP U6865

Miller, R. R.
F-94 RADOME ANTI-ICING FLIGHT TESTS. Rept. No. 8110, Lockheed Aircraft Corp. 33p. incl. illus. tables, graphs, diagrs. May 15, 1951.
ASTIA, AD 4949

Flight tests leading to the development of a satisfactory method of anti-icing the radome with an anti-icing fluid were made. Results show that anti-icing during normal climb and cruise flight through the icing range using glycol anti-icing fluid is practical. The amount of glycol required varies from 8.5-10 gal./hr. Glycol is superior to alcohol as an anti-icing agent, and chemically pure ethylene-glycol is recommended in preference to coolant glycol. Radome icing is minimized as the speed is increased, and the anti-icing fluid must be flowing before icing conditions are encountered.

SIP U6866

Holmes, J. F. and [illegible] Worthington
OCEANOGRAPHIC STUDIES ON PROJECT SKI-JUMP II. Tech. Rept. Ref. No. 53-23, Woods Hole Oceanographic Inst. 11p. illus. tables, graphs, maps, diagrs. April 1953. 5 refs. (Contract N6onr-27701)
ASTIA, AD 11348

Oceanographic observations from aircraft in the Polar Sea begun in 1951 were extended to include 5 additional stations. Ice observations show that thin ice is indicated by a jigsaw fracture pattern of low ridges and thick ice by heavy pressure ridges. The jigsaw pattern of low ridges was never found when the ice exceeded 3 ft. in thickness. Water circulation in the Polar Sea is discussed. The minimum temperature in the Beaufort Sea is about -0.45°C at 2300 m. (See also SIP U2155)

SIP U6867

Odell, N. E.
ANTARCTIC GLACIERS AND GLACIOLOGY. p.25-55 incl. map, diagrs. (In: The Antarctic Today ... ed. by Frank A. Simpson, A. H. & A. W. Reed in conjunction with The New Zealand Antarctic Soc. 1952). 19 refs.
DLC, G860.N45, 1952

The various land-ice formations and sea-ice forms are summarized in conjunction with the conditions under which they are found, and glaciological and glacial geological research conducted is described. The extent, thickness, surface features, and movement of the continental ice sheet, marginal features of the continental ice, glacier motion, barrier and shelf ice are discussed. Icebergs, pack ice, drift ice, floes, bergy-bit, growlers, brash ice, pancake ice, and ice foots are defined. A discussion of the variations in the continental ice is included.

SIP U6868

Pankov, M.
SMALL CONSTRUCTIONS IN PERMAFROST. (Malye iskusstvennye sooruzheniĭa v polose vechnoĭ merzloty; Text in Russian). Transportnoe Stroitel'stvo, 2, No. 1:20-24 incl. diagrs. 1932.
DLC, HE7.T7, v. 2

The use of reinforced concrete conduits in place of wooden bridges is recommended in permafrost areas on the Amur railroad line. The internal diam. of ducts of elliptical or rectangular aperture is 1-3 m. depending on the height of fills. A foundation of wood-concrete and a 22-cm. thick wooden frame on the top and sides serve for better insulation. The surfaces of the ducts are waterproofed by a 2-cm. thick layer of cement-ceresit. The construction of connecting links which are most vulnerable to frost heaving is described.

SIP U6869

Mikhaĭlov, A. F.
TUNNEL CONSTRUCTION IN PERMAFROST. (Ustroĭstvo tonneliĭa v vechnoĭ merzlote; Text in Russian). Transportnoe Stroitel'stvo, 3, No. 5-6:27-28 incl. illus. table, diagrs. 1933.
DLC, HE7.T7, v. 3

The construction of a railroad tunnel in permafrost is described. The stones cut from the tunnel were utilized for a wall support by using a 1:3 cement mixture. No deformation was observed during an 18-yr. period.

SIP U6870

Tregubov, V. V.
DATA FOR PLANNING CONSTRUCTION IN PERMAFROST. (Dannye neobkhodimye dlîa proektirovaniîa sooruzheniĭ v usloviîakh vechnoĭ merzloty; Text in Russian). Transportnoe Stroitel'stvo, 3, No. 8:11-12, 1933.
DLC, HE7.T7, v. 3

A review is given of the pertinent data necessary before initiating construction under permafrost conditions. The depth of permafrost or of maximum frost penetration in the absence of permafrost is determined by drill holes in Sept. or Oct. The long axis of construction should be oriented to minimize southern exposure. The relief of the permafrost table must also be determined.

SIP U6871

Saltykov, N. I.
PLANNING WINTER EXCAVATION. (O proekte organizatsii zimnikh zemlîanykh rabot; Text in Russian). Transportnoe Stroitel'stvo, 3, No. 12:5-10 incl. tables, graphs, diagrs. 1933.
DLC, HE7.T7, v. 3

The processes of soil freezing and the solution of possible winter excavation problems are discussed. Formulas and graphs are given for calculating the required manpower depending on weather and soil conditions. Most of the calculations can be made from observed air and soil temperature data compared with normals.

SIP U6872

Morozov, K. D.
CONSTRUCTION OF BRIDGE SUPPORTS IN PERMAFROST. (Sooruzhenie mostovykh opor v usloviîakh vechnoĭ merzloty; Text in Russian). Transportnoe Stroitel'stvo, 3, No. 4:16-18 incl. tables, 1933.
DLC, HE7.T7, v. 3

Bridge foundations erected in permafrost by the passive method and control measures are discussed. Ultimate strength data of permafrost containing more than, and less than 50% water at 1°C are tabulated for all types of soil. Data for temperatures of -5° to -25°C and water content of 10-50% indicate that clayey soils have greater strength than sandy soils. Adfreezing strength increases with the increasing water content, decreasing temperature and roughness of the surface. Frost heaving countermeasures consist of preserving the permafrost and decreasing the adfreezing area.

SIP U6873

Evdokimov-Rokotovskiĭ
PLANNING OF STONE BRIDGE SUPPORTS IN PERMAFROST. (Proektirovanie kamennykh opor mostov v raĭonakh vechnoĭ merzloty; Text in Russian). Transportnoe Stroitel'stvo, 3, No. 12:13-16 incl. illus. diagrs. 1933. 3 refs.
DLC, HE7.T7, v. 3

The branched type of stone bridge supports suggested by Morozov are criticized and solid abutments and piers are recommended. Lean and porous concrete is objectionable for foundation footings because of water penetration and subsequent frost damage. Wooden forms are placed in good quality concrete for footings to increase adhesion and protection from water. Instructions are given for preparing the mixes, for shading the bridge supports with wooden cribs loaded with stones and application of wood concrete. (See also SIP U6827)

SIP U6874

Fedorov, M.
PERMAFROST AND DATA NECESSARY FOR CONSTRUCTION PLANNING. (Vechnaîa merzlota i dannye, neobkhodimye dlîa proektirovaniîa sooruzheniĭ; Text in Russian). Transportnoe Stroitel'stvo, 3, No. 12:12-13, 1933.
DLC, HE7.M7, v. 3

Further discussion is presented of construction planning data in permafrost initiated by Tregubov. Planning of road lines in permafrost along valley floors is not recommended because of difficult drainage. Cuts are backfilled with non-heaving material and insulated. The adfreezing strength of wet soil to concrete and wood at -10°C are 18 and 20 kg./sq. cm. for clay, 5 and 6 kg./sq. cm. for gravel, and 2 and 3 kg./sq. cm. for crushed stone. Crushed-stone backfill is permissible when drainage is difficult. (See also SIP U6870)

SIP U6875

Mikhaĭlov, A. F.
FOUNDATION CONSTRUCTION IN WATER-BEARING GROUND IN PERMAFROST. (Ustroĭstvo osnovaniĭ v vodonosnykh gruntakh v vechnoĭ merzlote; Text in Russian). Transportnoe Stroitel'stvo, 3, No. 7:34-35; No. 9:27-30 incl. diagrs. 1933.
DLC, HE7.T7, v. 3

Excavation through the removal of artificially frozen soil as practised along the Transbaikal, Amur and Ussuri railroad lines is discussed. The pit walls and the bottom are exposed to frost and the frost penetration is measured. Soil layers 15 cm. thick are removed after each successive freezing to a depth of 30 cm. Iron pipes sunk in sections of 1.5-2 m. are used for rapid freezing of pit bottoms. Pits and shafts are excavated to a depth of 26 m. in permafrost with drills and pneumatic hammers at air pressures of 3-5 atm.

SIP U6876

Zukriegel, Josef
CRYOLOGIA MARIS (STUDY OF SEA ICE). Praha, Geographical Inst. Charles IV. Univ. 1935. 177p. incl. illus. tables, maps. [700] refs.
DN-OH, GB 2401.Z94

Sea ice and its investigation from a genetic point of view, and with regard to the general character of the

ice, its distribution and to the types of sea ice are discussed. A history of sea-ice investigations and a survey of modern investigations are included. A terminology of common, special and local types of sea ice and the causes and influences which act on the formation of the different types are given. The life cycle of sea ice in the course of 1 yr. and a number of years is analyzed. The physical and chemical properties of sea ice, and the influence of climatic factors are discussed.

SIP U6877

[Boyd, H. B. and C. R. Foster]
APPLICATION OF TRAFFIC AND MEASUREMENTS OF SUBGRADE DEFLECTIONS AND DEFORMATIONS. Accelerated Traffic Tests, Waterways Exp. Sta. 29p. illus. tables, graphs, diagrs. Jan. 1952.
ASTIA, AD 10426

Traffic tests were run on 7 test sections in a permafrost research area north of Fairbanks (Alaska) to determine design criteria for thickness requirements for airfield pavements in permafrost areas. Selsyn motor-type deflection gages were installed in each lane of 4 of the sections which were paved with bituminous surfacing; 2 other sections were paved with portland cement concrete, and one was surfaced with PSP landing mat. The subgrade under all sections was a silty material containing traces of mica and considerable organic matter. The base material was a pit-run nonplastic sandy gravel. All traffic testing was accomplished with a specially constructed load cart towed by a model Super "C" Tournapull tractor. Measurements of deflection and deformation were made, and cone penetrometer readings were taken. The total thickness above the subgrade was adequate for the traffic applied in all lanes, except one. The quality of the base course was adequate. The bituminous surfacing was of poor quality.

SIP U6878

[Haerry, A.]
THE ACTION OF ICE ON DAMS. (Action de la glace sur les barrages réservoirs; Text in French). Rev. Gen. Electricité, 37:140, Feb. 2, 1935.
DLC, TK2.R35, v. 37

A report of ice action on Swiss and Italian dams is summarized. The ice pressure varied from 10-80 tons/m. of dam length. The ice cover in the reservoirs is not homogeneous but consists of alternate layers of crystalline ice, wet snow and water, with the ice attaining only a limited thickness. Ice adhered to the dam when the level of the water decreased.

SIP U6879

Winchester, James W.
A STUDY OF THE MOVEMENT OF ARCTIC SEA ICE IN THE CANADIAN ARCTIC IN RELATION TO METEOROLOGICAL, GEOGRAPHICAL, AND OCEANOGRAPHIC PARAMETERS. Dept. of the Navy, 15p. graphs, maps, diagrs. [1952]. 5 refs.
DWB, 551.311 U585s

An equation for computing the direction and magnitude of the water currents in the ocean from the vertical density distribution, the direction of the mass transport current in restricted waters, the direction of the tidal current in restricted waters, and a relationship between ice drift and surface wind velocity are developed theoretically. It is concluded that ice drifts with a speed of about 0.02 times the speed of the surface wind and, in the northern hemisphere, has a drift angle of about 45° to the right of the wind stress. An analysis of actual conditions encountered during Arctic operations is made. The tidal current is usually the major force acting on the drift and convergence of the ice in restricted waters. The direction and magnitude of water currents can be computed and used in the forecasts of ice drift if oceanographic stations are available.

SIP U6880

Chomicz, Kazimierz
SNOW COVER AND WATER ECONOMY IN POLAND. (Pokrywa śnieżna a gospodarka wodna w Polsce; Text in Polish). Gospodarka Wodna, 13:52-56 incl. tables, graphs, 1953. 4 refs.
DLC, Slavic unclassified

Mean data of snow-cover depth and duration obtained from 71 stations in Poland are tabulated and analyzed to determine run-off. The duration of the snow cover increased from an average of 64 days at elevations of 200-300 m. to 199 days at 1616 m. The mean depth of the snow cover increased with elevation from 28.3 cm. at 200-300 m. to 105 cm. at 1616 m. Water content of snow and time of snow melting determine the run-off of rivers in Poland.

SIP U6881

THERMAL ANTI-ICING SHIELDS F-89. Aviation Week, 59, No. 9:29 incl. diagr. Aug. 31, 1953.
DLC, TL501.A8, v. 59

The thermal system protects wings, empennage, wing-tip rocket pods, windshield, leading edges of engine intake ducts and forward frame components within the ducts. The airframe leading edge and power-plant component system utilize high temperature air bled from compressors in the twin jet engines. Automatically retracting screens provide additional icing protection. Electrical resistance heating is employed to protect the windshield, fuel vents and other sections. The system was developed by Northrop Aircraft.

SIP U6882

Ruggeri, Robert S.
DE-ICING AND RUNBACK CHARACTERISTICS OF THREE CYCLIC ELECTRIC, EXTERNAL DE-ICING BOOTS EMPLOYING CHORDWISE SHEDDING. NACA Res. Memo. No. RM E53C26, 32p. incl. illus. graphs, diagrs. May 25, 1953. 3 refs.
ASTIA, AD 10715

The performance characteristics of 3 cyclic, electric, rubber-clad deicing boots were evaluated. Each boot was operated in icing at design specifications of 21 w./sq. in. for cycled areas, 13 w./sq. in. for continuously heated parting strips, a heat-on time of 10 sec., and a cycle ratio of 10. For a free-stream velocity of approximately 395 ft./sec. the range of free-stream total temperature at which the icing protection afforded by the various boots became marginal was from 12°-15°F for values of liquid-water content employed. The runback characteristics of the boots were similar. The forward cycled segments, upper and lower surfaces, were the most critical areas for the 3 boots investigated. (NACA abstract)

SIP U6883

Lewis, James P. and Dean T. Bowden
PRELIMINARY INVESTIGATION OF CYCLIC DE-ICING OF AN AIRFOIL USING AN EXTERNAL ELECTRIC HEATER. NACA Res. Memo. No. RM E51J30, 43p. incl. illus. table, graphs, diagrs. Feb. 4, 1952. 12 refs.
DLC, G.P.R.R.

The investigation was limited to an air speed of 175 m.p.h. Data are presented to show the effects of variations in heat-on and heat-off periods, ambient air temperature, liquid-water content, angle of attack and heating distribution on the requirements for cyclic de-icing. The external heat flow at various icing and heating conditions is presented. A continuously heated parting strip at the airfoil leading edge was found necessary for quick, complete and consistent ice removal. The cyclic power requirements were found to be primarily a function of the datum temperature and heat-on time, with the other operating and meteorological variables having a second-order effect. Short heat-on periods and high power densities resulted in the most efficient ice removal, the minimum energy input, and the minimum runback ice formations. (Authors' abstract)

SIP U6884

Fraser, D.
NOTE ON THE FLIGHT TESTING AND ASSESSMENT OF ICING PROTECTION SYSTEMS. Lab. Rept. LR-50, Natl. Aeronaut. Establishment Can. 6p. graphs, March 1953. 1 ref.
DLC, G.P.R.R.

Flight tests of an icing protection system consist of functioning tests, tests to determine the internal efficiencies, and tests of the performance in icing. The performance in icing can be determined only if the appropriate measurements are made, and if the flow of protection or the icing severity can be adjusted. The results can be reduced to standard conditions, using theoretical corrections, and can be plotted on a diagram to show whether performance meets design requirements, or to assess the degree of protection afforded by the ultimate, or any lower, performance. (Author's abstract)

SIP U6885

Fraser, D.
METEOROLOGICAL DESIGN REQUIREMENTS FOR ICING PROTECTION SYSTEMS. Lab. Rept. LR-49, Natl. Aeronaut. Establishment Can. 14p. table, graphs, appendices, March 1953. 18 refs.
DLC, G.P.R.R.

The meteorological parameters which affect various icing protection systems are considered, and these parameters are used to define basic severity and distribution requirements. The characteristics of various protective systems are examined, and it is shown how the requirements should be applied. A specific application to an alcohol spray system is used to demonstrate how conformity to the requirements is judged, and to show how concessions from the requirements can be quantitatively evaluated. (Author's abstract)

SIP U6886

Wegener, Alfred and others
GERMAN INLAND ICE EXPEDITION TO GREENLAND IN THE SUMMER OF 1929. (Deutsche Inlandeis-Expedition nach Grönland Sommer 1929; Text in German). Z. Ges. Erdkunde Berlin, No. 3-4:81-124 incl. illus. tables, graphs, map, diagrs. 1930. 18 refs.
DLC, G13.G5, 1930

A preliminary report of the results of the expedition is presented. Data on ablation and accumulation, ice thickness, radiation measurements, and meteorological observations are included.

SIP U6887

Soczawa, Victor
THE ANADYR' AREA. (Das Anadyrgebiet; Text in German). Z. Ges. Erdkunde Berlin, No. 7-8:241-263 incl. illus. map, 1930. 33 refs.
DLC, G13.G5, 1930

The area is geographically divided into the mountainous regions, oblate-shaped mountain reliefs of 300-500 m. in elevation, the flat and hilly tundra, and the river valleys. The orography and geomorphology of each region are discussed. The permafrost table is at a depth of 30-50 cm. in the tundra region with clay and loam subbase; in sandy soils the table is located at depths of 60-100 cm. and usually begins at 100 cm. in the river valleys. The depth of the permafrost table is chiefly a function of the character of the vegetative cover. Sandy and rocky soils thaw more rapidly at the beginning of summer than the clayey

and loamy soils. The extensive development of spotty tundra in this area is indicated. The distribution of the main vegetative types in the various regions is analyzed.

SIP U6888

Holmsen, Gunnar
GROUND ICE IN SPITSBERGEN... (Spitsbergens jordbundsis...; Text in Norwegian with German summary). Norske Geografiske Selskabs Aarbog, 24: 1-150 incl. illus. tables, map, appendix, 1913. 48 refs.
DLC, G25.N8, 1912-13

Investigations made during 1912 are discussed and earlier research in many parts of the arctic described. Ground ice in Spitsbergen was found in flaky layers or caps up to 4 km. long. The green color of the upper portion of the ice layers is probably due to dissolved lime in the surface water. The grains are not optically oriented and the ice layers cannot be separated. Ground ice is built up by surface water filtration in the summer. Ground ice requires a mean annual temperature of -4° to -6°C, is more extensive on flat ground than hillsides, and requires an earth cover capable of absorbing large amounts of moisture.

SIP U6889

[Atwater, Montgomery M. and Felix C. Koziol]
AVALANCHE HANDBOOK. Dept. of Agriculture, Forest Service. 146p. incl. illus. tables, graphs, diagrs. [1953]. 21 refs.
DLC, G.P.R.R.

The phases of avalanche hazard evaluation and control, and research methods developed to evaluate hazard and snow stability are described. Included are basic causes of avalanches, characteristics, forecasting, protective measures, rescue, and snow safety plans. The past and present avalanche hazard in the U. S. and avalanche studies in the Alps, U. S. and 3 Alpine zones (U. S.) are outlined. Avalanche research in the U. S. by means of precipitation intensity, penetrometer, and snowfall studies, as well as by storm plot analysis, colored thread profiles, and avalanche timing is analyzed. Standard snow terminology and a glossary of special terms are appended.

SIP U6890

Bonchkovskiĭ, V.
STUDY OF SNOWSTORMS. (Issledovanie elementov meteleĭ; Text in Russian). Meteorologicheskiĭ Vestnik, 31:1-20 incl. tables, 1921. 3 refs.
DWB, M(05) R969me, v. 31

Size, weight and motion of snowflakes were studied during 1920-21 at Kuchino (near Moscow). Typical snowflakes of each snowstorm were weighed and photographed. The mean wind speed in snowstorms was about 8 m./sec. and air temperatures ranged from 0° to -14°C. The mean weight of separate snowflakes varied from 0.0045 gm. (falling snow) — 0.0025 gm. (drifting snow). The speed of snowflakes falling in calm weather varied from 0.32-2.0 m./sec.

SIP U6891

Shipchinskiĭ, A.
INFLUENCE OF A FENCE ON THE AMOUNT OF PRECIPITATION IN A GAGE. (Vliîanie zaborno zashchity na pokazaniîa dozhdemera; Text in Russian). Meteorologicheskiĭ Vestnik, 31:21-32 incl. tables, 1921.
DWB, M(05) R969me, v. 31

Methods of shielding gages were investigated at the Voronezh Experimental Station during 1912-1915. Monthly measurements with a standard gage equipped with a Nipher shield, a gage encircled with a wooden fence, and an unshielded gage are tabulated and discussed. No wide differences were found for liquid precipitation and for snowfall in calm weather. The fence prevented snow loss from the gage due to strong winds, but eddies originating inside of the fence drifted snow into the gage from the ground. Considerable snow amounts were occasionally found in the gage protected by the fence without snow falling.

SIP U6892

Al'tberg, V.
WATER SUPERCOOLING AND ICING OF WATER PIPES IN THE NEVA RIVER AT A DEPTH OF 63 FEET. (Pereokhlazhdenie vody v Neve i obmerzanie vodopriemnykh trub na devîatisazhennoĭ glubine; Text in Russian). Meteorologicheskiĭ Vestnik, 31: 181-192 incl. table, 1921. 5 refs.
DWB, M(05) R969me, v. 31

Reports on anchor ice and water temperature observations made in the Neva River near Leningrad during 1914-1920 are discussed and the data of 1920 are tabulated. Water supercooled to -0.05°C and produced anchor ice up to 0.3 m. thick. Intensive anchor ice formation was observed around water-supply pipes located at river depths to 63 ft. Surface ice cover prevented further formation of anchor ice. Anchor ice formation in 1920 occurred only during cloudy weather.

SIP U6893

Vitkevich, V. I.
SNOW DEPOSITS NEAR FENCES OF VARIOUS FORMS. (Snezhnye navevaniîa u shchitov razlichnykh form; Text in Russian). Meteorologicheskiĭ Vestnik, 31:215-220 incl. table, diagr. 1921.
DWB, M(05) R969me, v. 31

Form and density of snow deposits with different type snow fences were investigated at Kuchino (near Moscow) during the winter of 1919-20. Solid snow fences and fences with horizontal and vertical slats were installed over an ice-covered lake. The fences with vertical slats retained the most snow. The snow deposit near the fence indicated strong eddies, which prevented further drifting. Poorest results were obtained from snow fences with horizontal slats.

SIP U6894

Averin, N. D.
WINTER EXCAVATION WORK. (Proizvodstvo zemlianykh rabot v zimnee vremia; Text in Russian). p.63-75 incl. tables. (In: Spravochnoe posobie po proizvodstvu zemlianykh rabot, ed. by D. D. Kozhevnikov, Moscow, Stroĭzdat, 1948). 2 refs.
DLC, TA715.M6, 1948

Directions for winter excavation operations are given. Empirical data for calculating the rate and depth of frost penetration of excavated ground are tabulated. Methods are outlined for thawing and loosening of frozen ground.

SIP U6895

Meinardus, Wilhelm
THE RESULTS OF ICE THICKNESS MEASUREMENTS MADE DURING THE GERMAN GREENLAND EXPEDITION ALFRED WEGENER. (Die Ergebnisse der Eisdickenmessungen auf der Deutschen Grönland-Expedition Alfred Wegener; Text in German). Z. Ges. Erdkunde Berlin, No. 9-10:343-351 incl. table, Dec. 1934. 4 refs.
DLC, G13.G5, 1934

The seismic ice-thickness measurement results published by Brockamp, Sorge and Wölcken are summarized and reviewed. (See also SIP U3283 and U3289)

SIP U6896

Sandström, J. W.
THE SWEDISH RESCUE EXPEDITION TO SPITSBERGEN 1928. (Den svenska undsättnings-expeditionen till Spetsbergen 1928; Text in Swedish). Ymer, 48:321-362 incl. illus. 1928.
DLC, GN1.Y5, v. 48

The narrative of the expedition is presented. A frost penetration of 300 m. was estimated from the air temperature (mean -9°C); a depth of 312 m. was measured in a coal mine. Formation and distribution of the existing glacier and sea ice are discussed. The influences of the surrounding Gulf Stream, South Cape Stream and the Polar Stream are mentioned in reference to Scandinavian climate. Most of the climatic data were found in a manuscript in the Library of Kings Bay. It is mentioned as a peculiarity that iron will not rust at Spitsbergen.

SIP U6897

Gol'dshteĭn, M. N.
FROST HEAVING IN FREEZING. (Puchenie gruntov pri promerzanii; Text in Russian). Trudy Vsesoiuznogo Instituta Zheleznodorozhnogo Transporta (Moscow), 16:33-129 incl. illus. tables, graphs, diagrs. 1948. [25] refs.
DLC, TF225.M6, v. 16

Ice separation and frost heaving are influenced by soil particle size, temperature and initial moisture content. The relationships between ice separation and hydrological regime are discussed for all cases of ground containing bound water alone or in combination with capillary and gravitational water. Existing frost heaving theories and particularly the hydration theory are reviewed. The freezing of capillary-ground water is estimated by computing the excessive moisture. Crack formations in frost heaving and various control measures are described.

SIP U6898

Prik, Z. M.
CLIMATIC OUTLINE OF THE KARA SEA. (Klimaticheskiĭ ocherk Karskogo moria; Text in Russian). Trudy Arkticheskogo Instituta (Leningrad), 187:5-442 incl. tables, graphs, maps, 1946. 30 refs.
DLC, G600.L4, v. 187

Observational data of 22 meteorological stations and ships from 1895-1939 are tabulated for each month. Permafrost occurs at depths deeper than 1 m. in the west and at a depth of 0.6 m. in the northeast. Frequent snowstorms (up to 112 days/yr.) caused an irregular distribution of snow cover and a loss of snow from gages. The monthly sums of winter precipitation averaged 2.5-3.5 times lower than values obtained from measurements of snow cover depth and density. Snow covers the area an average of 225 (Amderma) to 309 days (Chelyuskin Cape). The density is near 0.30 at the beginning of winter, and about 0.40-0.42 near the end. Glaze formation occurs about 10 days/yr. during spring and autumn.

SIP U6899

Mercanton, P. L.
GRAUPEL FORMATION. (Formation du grésil; Text in French). Météorologie, 5:274-275, April-June 1929.
DWB, M(05) S678mm, v. 5

Graupel was found on the ground at an early morning temperature of 0.0°[C] following a night temperature of -1.4°[C]. This formation was examined with a microscope. Snow crystals, graupel and intermediate forms were noted. It is concluded that the crystals of a snow flurry collided with supercooled water droplets in their descent and became partially or totally covered.

SIP U6900

Hill, Hibbert M.
PRECISE TAPE MEASUREMENT OVER ICE. Military Engr. 16:328-329 incl. illus. July-Aug. 1924.
DLC, TA[illegible]

Precise traverse and base-line measurements were completed over the ice of Rainy and Namakan Lakes (Minn.). The equipment consisted of thermometers to -30°C, four 50-m. invar tapes, a 30-m. pocket steel tape, a 4-in. theodolite, a 300-ft. steel tape, staves, balances, and tripods. The method of taping is described. One measurement of the traverse line was made with the invar tape and it was checked with

a 300-ft. steel tape and by measuring an 8.4-km. base-line with invar tape. Unusually close agreement resulted. A precise traverse can be measured on ice when the marked points are placed in areas where the ice is partly anchored to the shore to minimize and compensate for the horizontal movements of the ice.

SIP U6901

Loughland, George E.
ICE FORMATIONS IN THE MAIN SIERRA CANAL. Military Engr. 16:487-490 incl. illus. Nov.-Dec. 1924.
DLC, TA1.P85, v. 16

The 14-Mile House Tunnel (Calif.) is subjected to surface, frazil, and anchor ice formations. Surface ice forms at an air temperature of 32°F. Frazil ice forms in agitated water supercooled 0.01° below 32°F. Anchor ice forms rapidly on dark cold nights in flumes, on dark rocks and dark green moss. A design for sluices and spillways has been made to provide for sand accumulations, quick and positive acting gates under all conditions, automatic canal level control under conditions of maximum run-off, and protection of closed gates against freezing. The installation of accurate air and water thermometers is recommended. Covering the flumes at the 12.5-mi. station would eliminate accumulations in the sections between the flumes.

SIP U6902

Lappo, S.
NAVIGATION CONDITIONS IN THE NORTHERN LATITUDES. (Usloviîa plavaniîa v severnykh shirotakh; Text in Russian). Sovetskaîa Arktika, 7, No. 2:25-30 incl. illus. 1941.
DLC, G600.S6, v. 7

Data of many polar expeditions beginning with the Nansen expedition on the Fram are reviewed. These data indicate that the Kara Sea was ice-free 6 times from early Aug. during 1930-1940. Ice-free areas were often observed around Severnaya Zemlya, New Siberian and Vrangel islands. Ice conditions in the southern part of the Polar Ocean do not indicate the ice situation in the north. Frequently navigation conditions are better in the north than in the south.

SIP U6903

Kersten, Miles S.
PROGRAM FOR STUDY OF PATTERNED GROUND. Mechanical Eng. Dept. U. Minnesota, 69p. Nov. 1953. 26 refs. (Contract DA-21-018-ENG-256)
SIPRE files

A general review of patterned ground with suggestions for a field research program is presented, based on a literature study and discussions with specialists. The status of information on patterned ground and need for additional work are outlined. General reconnaissance studies of patterned ground to be made and the selection of sites for detailed studies are indicated. Detailed studies of ice wedge, stone and soil polygons are individually treated including geometric arrangement, excavation, borings, soil tests, temperature observations, probings, moisture measurements, vegetation and organic material, vertical surface and pressure movements, climatic data, geological report, and accompanying laboratory study.

SIP U6904

Wilson, Walter T.
STORAGE AND MOVEMENT OF LIQUID WATER IN A SNOWPACK. U. S. Weather Bureau, 7p. incl. table, Oct. 12, 1953. (Ms.)
SIPRE files

The residual water-holding capacity of a large mass of snow rarely exceeds 5% of its water equivalent. Melted snow or rain water in excess of this amount is delayed about 30 min./ft. of depth in passing through the pack. The rate of water movement is much faster in low-density snow. Thermal effects in the snow pack and overland flow and detention storage are discussed. The delay of liquid water in passing through a snow pack is well within the limitations of the distribution graph or routing coefficients of most drainage areas of appreciable size. The effects of storage and delay of liquid water in a snow pack can frequently be neglected in forecasting stream flow. Methods described for estimating water equivalent of a snow pack include the application of an average density factor to observed snow depth, and the summation of precipitation of snow and cold, light rain during the period following establishment of a snow cover.

SIP U6905

Diamond, Marvin and W. P. Lowry
CORRELATION OF DENSITY OF NEW SNOW WITH 700 MB TEMPERATURE. Res. Paper 1, Snow, Ice and Permafrost Research Establishment, 3p. incl. graphs, Aug. 1953. 3 refs.
SIPRE files

New-snow density was measured at the Central Sierra Snow Lab., and the air temperature at both 700- and 500-mb. levels was used to study the relationship between upper air conditions and the density. The upper air temperatures were determined from radiosonde flights at Oakland (Calif.) immediately prior to or at the same time when the density was measured. A graph of the air temperatures at the 700-mb. level against the new-snow density indicates a definite relationship between the 2 variables. The correlation coefficient of 0.639 is significant at the 1% level. No relationship was found for the 500-mb. level. Surface-air temperatures were plotted against the new-snow density. The correlation coefficient between the variables is 0.503 which is significant at the 1% level.

SIP U6906

Flint, Richard F.
SNOW, ICE AND PERMAFROST IN MILITARY OPERATIONS. SIPRE Rept. 15, 6p. incl. tables, diagrs. Sept. 1953.
SIPRE files

The background history, mission and operational features of SIPRE are outlined. Basic research, long-range plans, field studies, cooperation with other agencies, and expected results are discussed. Operational needs and research to meet the needs are indicated. SIPRE performs fundamental scientific research as well as applied engineering research since the fundamental properties of snow and ice have not been established by civilian research. Military problems created by cold climate are summarized.

SIP U6907

[Johnson, A. W.]
BIBLIOGRAPHY ON FROST ACTION IN SOILS. Bibliography No. 3, Highway Res. Board, 57p. 1948.
SIPRE files, S-1450

An annotated bibliography containing 283 references related to frost heave and frost action in soils, and covering the period from 1890-1948 is presented. Arrangement is chronological and a classified subject and author index are included.

SIP U6908

Kittredge, Joseph
INFLUENCES OF FORESTS ON SNOW IN THE PONDEROSA-SUGAR PINE-FIR ZONE OF THE CENTRAL SIERRA NEVADA. Hilgardia, 22:1-96 incl. tables, graphs, March 1953. 43 refs.
DWB, M79.2 K62i

The forested zone of the west slope of the Sierra Nevada was studied to determine what kinds, sizes, and densities of forests are most effective in promoting the accumulation of snow, in minimizing the losses by evaporation, and in retarding and prolonging the melting period. The collection of data in the field extended from Dec.-June for 7 seasons and comprised more than 20,000 individual records from 100 stations. New snow in the open had an average density of 10%. Densities under the crowns were from 1-5% higher. The maximum depth of total snow on the ground was greater in the open areas or in the stands with large openings where the dates of occurrence of the maximums were also earliest. The dates for maximum depth were earlier than those for maximum water equivalent. Evaporation from snow was much lower than that from water and tended to be lower in openings than under crowns. Snow temperatures at 3 in. below the surface were 32°F during melting periods, and varied with mean daily air temperatures below freezing.

SIP U6909

Lewis, William
REPORT OF A VISIT TO FAIRBANKS, ALASKA FOR THE OBSERVATION AND STUDY OF ICE FOG. U. S. Weather Bureau, 4p. Feb. 4, 1948. 3 refs. (Typed ms.)
DWB, PF 6778

The formation of ice fog depends on the occurrence of low temperatures with a strong surface inversion, calm or very light winds, and the presence of smoke and combustion products in the air. Smoke particles act as centers of radiation, allowing the air to cool by radiation as well as by contact and diffusion. This makes it possible for the air to cool to saturation without losing its water vapor to the snow surface. The effect of the water vapor produced by the combustion of fuels is believed to be important in ice fog formation. Ice fog is controlled by reducing air pollution. It was suggested that ice fog may be controlled by using fans or helicopters to mix the surface air with warmer upper air. The effectiveness of this method would depend on the vertical distribution of humidity.

SIP U6910

Sofronov, G. P.
PERMAFROST. (Vechnaîa merzlota; Text in Russian). Trudy Instituta Merzlotovedeniîa im. V. A. Obrucheva, 6:72-81 incl. table, diagrs. 1944.
DLC, Slavic unclassified

Permafrost conditions in the Vorkuta river valley have been studied at the Research Station since 1936. The thickness of permafrost varied from 84-132 m. The configuration of the upper surface of permafrost depends on the forms of relief and microclimatic and hydrogeological conditions. Little soil freezing occurred in winter and the permafrost table was deep in areas with thick snow cover and beneath the river bottom. Winter freezing penetrated to the permafrost layers in elevated areas. The usual temperature of permafrost layers was near 0°C with a minimum of -1.5° to -1.9°C. The depth of the active layer varies from 7-10 m.

SIP U6911

Hansen, H. E.
ATLAS OF PARTS OF THE ANTARCTIC COASTAL LANDS. (Atlas over dele av det antarktiske kystland; Text in Norwegian and English). Oslo, Gröndahl, 1946, 12p. incl. illus.; 12 maps (loose-leaf)
DLC, Map Div.

The results of Consul Lars Christensen's Mapping Expedition of 1936-37 are briefly discussed and presented in 12 separate maps. The mapping work was conducted by taking oblique photographs of the land with a mapping camera during flights along the coast. The plottings were made on scales ranging from 1:25,000-1:200,000. The land mapped (350,000 sq. km.) is ice-covered with the exception of a few nunataks. Pack-ice, partly unbroken sea ice and

partly open water were found off the coast. Icebergs frozen to solid sea-ice areas indicate that breakup occurs at intervals.

SIP U6912

Hansen, H. E.
ATLAS OF ANTARCTICA AND THE ANTARCTIC OCEAN. (Atlas over Antarktis og Sydishavet; Text in Norwegian). table, maps. [1936]
DLC, Map Div.

The atlas contains 16 maps and a list of antarctic and subantarctic flowers, seals and birds. The maps indicate pack-ice distribution on various dates, routes of expeditions, wind velocities, air temperatures, geologic and oceanographic features, and zoological and botanical distributions.

SIP U6913

MAN-MADE BLIZZARDS. Mech. Eng. 70:145-146, Feb. 1948.
DLC, TJ1.A72, v. 70

Artificial snowstorms for equipment tests under arctic conditions were produced in a large low-temperature chamber provided with non-frosting observation windows. A -40°F temperature was maintained by ammoniac compressors powered by 700-hp. electrical motors. Supercooled clouds or fog were produced by injecting high-temperature steam and nucleation was induced by adding CO_2 into the cloud at cloud temperatures of 5°-10°F. The water vapor crystallizes at -40°F cloud temperature and the billions of microscopic ice crystals form snowflakes through colliding with each other. High-speed, motor-driven propellers produce high winds and the subsequent blizzard effect.

SIP U6914

Seeley, Dewey Alsdorf
A HEAVY DEPOSIT OF HOARFROST AND ITS EFFECT IN RETARDING NOCTURNAL COOLING. Monthly Weather Rev. (U. S.), 33:155 incl. graph, April 1905.
DLC, QC983.A2, v. 33

The heat of sublimation evolved from a heavy frost deposit was calculated to be sufficient to raise the air temperature 10°F for 525 ft. above the ground. The liberated heat retards atmospheric cooling. A thermogram shows the temperature-fall retardation during the night.

SIP U6915

Vize, V. Iu.
PASSAGE OF THE SHIP "STAVROPOL" TO THE MOUTH OF THE KOLYMA RIVER IN 1924-25. (Kolymskiĭ reĭs parakhoda "Stavropol'" v 1924-25 godu; Text in Russian with German summary). Izvestiia Tsentral'nogo Gidrometeorologicheskogo Biuro (Leningrad), 6:135-142 incl. tables, 1926.
DLC, Slavic unclassified

Observations during wintering near Shalaurov Island (Eastern Siberian Sea) are tabulated for the period Oct. 1924-June 1925. Precipitation fell only as snow and was observed on 63 days. The new ice cover, 9 cm. thick on Sept. 13, increased to 42 cm. on Nov. 6 and 122 cm. in Feb. A maximum thickness of 194 cm. was reached on May 4, 1925, which decreased to 177 cm. in early June.

SIP U6916

Liutnitskiĭ, A. Iu.
EXPERIMENTAL MEASUREMENTS OF RIME AND GLAZE INTENSITY AT MARKHOT PASS. (K postanovke opyta izmereniia kolichestva osadkov ot izmorozi i gololediċy na Markhotskom perevale; Text in Russian). Izvestiia Tsentral'nogo Gidrometeorologicheskogo Biuro (Leningrad), 6:394-398 incl. tables, 1926.
DLC, Slavic unclassified

Rime and glaze occur frequently at Markhot Pass (near Novorossiisk, Caucasus) covering objects with crusts 15-25 cm. thick. Rime falling from elevated objects covered the ground up to 5-10 cm. thick. Rime occurred an average of 39 days/yr. and only with fog. Rime and glaze intensity was measured with wooden and well-oiled balls, 500-1000 sq. cm. in area, and with wires, 2-4 mm. in diam. and 1 m. long. Preliminary results of these measurements are tabulated.

SIP U6917

Kabanov, P. G.
SNOW TRANSFER INFLUENCED BY WEATHER. (Pereraspredelenie snega pod vliianiem pogodnykh faktorov; Text in Russian with English summary). Sotsialisticheskoe Zernovoe Khoziaĭstvo (Saratov), 6, No. 1:80-89 incl. tables, 1936. 5 refs.
DLC, Slavic unclassified

Conditions of snow transfer were studied during 1932-1935 near Saratov. Wind velocity, snow-cover density, surface condition and moisture content are the principal factors determining snow transfer. Wind initiating snow transfer also causes snow compaction, which prevents further drifting. Even light wind (1-2 m./sec.) forms a thin ice crust over the snow surface. Winds at 7-12 m./sec. produced a dense crust 4 cm. thick within 2-3 days. Massive snow transfer occurred at air temperatures below -5°C. Snow fences with 50% open spaces can retain most snow drifted by winds at 5-10 m./sec. More compact snow fences are needed at wind velocities over 10 m./sec.

SIP U6918

Lie-Petersen, O. J.
"SNOW FLEAS" AND "RAIN WORMS". ("Snelopper" og "ormeregn"; Text in Norwegian). Naturen, 25: 200-206 incl. illus. 1901.
DLC, Q4.N15, v. 25

Reports of worm-like zootypes on red and black snow

are discussed. Dessor and Agassiz observed that the zootypes could penetrate glacial ice. The animals were observed inside the ice when sections of glacier ice were held against the light. The presence of the worms indicates that glacier ice is not compact but is perforated by grooves and pores. These zootypes bore through the snow cover and appear on the snow surface, or they may be grouped on the ground after the snow melts.

SIP U6919

Reusch, Hans
A NOVEL PRECIPITATION GAGE. (En ny nedbørsmaaler; Text in Norwegian). Naturen, 25:377-378 incl. illus. 1901.
DLC, Q4.N15, v. 25

The snow gage consists of a copper bucket supporting a conical sheet-iron funnel for snow accumulation. Salt within the gage permits the snow to melt even at low temperatures. Three l. of kerosene which remains liquid at -30°C retard evaporation. The gage is read once a year. Tests in the Sarjek Mt. (Sweden) show that precipitation increases heavily between 1000 m. and 1500 m. Precipitation was about 3 m. at 1500 m. above sea level, and 0.5 m. at 336 m. above sea level (Kvickjock Station).

SIP U6920

Hobbs, William Herbert
THE RÔLE OF THE GLACIAL ANTICYCLONE IN THE AIR CIRCULATION OF THE GLOBE. Proc. Am. Phil. Soc. 54:185-225 incl. maps, diagrs. Aug. 1915. 81 refs.
DLC, Q11.P5, v. 54

The sweeping of surface snow deposits from the central areas of the Greenland inland ice and its accumulation at the margins of continental glaciers is a consequence of strong anticyclonic conditions. Enormous snowdrifts which piled up for 4 consecutive days upon the Beardmore glacier apron are ascribed to drifts in process of melting as a result of adiabatic rise in temperature in descending currents.

SIP U6921

Magono, Chōji
ON THE FALL VELOCITY OF SNOWFLAKES. J. Meteorology, 8:199-200 incl. illus. graph, June 1951. 2 refs. (Correspondence)
DLC, QC851.A283, v. 8

The fall velocities of snowflakes and snow crystals were measured by calculating the time required for the flake or crystal to reach the ground from a height of 4.2 m. The maximum diam. of the flakes was visually estimated, and the flakes were photographed while falling. The velocity is approximately proportional to the square root of the maximum diam. The snowflake deforms into an inverted cone shape while falling. (See also SIP U6832)

SIP U6922

Yoshida, Usaburo and Shogo Tsuboi
EXAMINATION OF ICE-CRYSTALS BY X-RAYS. Mem. Coll. Sci. Kyoto Imp. Univ. Ser. A, 12:203-208 incl. illus. diagrs. July 1929. 2 refs.
DLC, QK77.K7, v. 12

The orientation of ice crystals obtained from the surface of calm water, from ice columns in the ground, and from icicles was determined by Laue photographs. The direction of growth in each case was parallel to a direction in the basal plane of the hexagonal crystal. No regularity of orientation existed in ice formed by rapid cooling. The crystals are entirely at random in artificial ice and frost. (Chem. Abstracts)

SIP U6923

DETERMINATION OF THE THICKNESS OF GLACIER ICE. Engineering, 129:508, April 18, 1930.
DLC, TA1.E55, v. 129

The seismic method with which the Wegener Greenland Expedition determined the thickness of the inland ice is described. Dynamite charges of 2-13.5 kg. were exploded in the ice. The surface detonation wave and the wave reflected from the rocky base of the ice were received 1-2 km. from the hole. The waves are received and magnified by a seismograph, transferred to a microphone which is in circuit with a battery and galvanometer, the oscillations of which are recorded on a photographic film. The longitudinal waves travelled at an average velocity of 3400 m./sec. and the transverse waves at 1600 m./sec. Ice thicknesses of 330, 600, 750 and 1250 were obtained at distances from the coast up to 40 km. inland. The upper level of the ice surface increased inland from 970-1570 m.

SIP U6924

Trupak, N. G.
ACCUMULATION OF NATURAL COLD FOR GROUND FREEZING. (Akkumulîâtsiîâ estestvennogo kholoda dlîâ zamorazhivaniîâ gruntov; Text in Russian). Stroitel'naîâ Promyshlennost', 17, No. 6:47-50 incl. table, graphs, diagrs. 1939. 5 refs.
DLC, TH4.S85, v. 17

A method is described for utilizing natural, cold air for freezing ground without refrigeration machinery. A $CaCl_2$ solution freezing at -55°C is pumped in a cooling tower and cooled by external air. The cooled solution can be transferred in pipes and used to freeze soil in mines over 90 m. deep, in water-saturated pits, in the construction of dams, docks, and building foundations. A combined method utilizes cold air in summer and permafrost in winter. The control of landslides by freezing the soil is indicated.

SIP U6925

Bowen, E. G.
RADAR OBSERVATIONS OF RAIN AND THEIR RELATION TO MECHANISMS OF RAIN FORMATION. J. Atmospheric Terrestrial Phys. 1:125-140 incl. illus. tables, graphs, diagrs. 1951. 16 refs.
DLC, QC801.J6, v. 1

Ground and airborne radar was used to examine radar echoes from rain, one of which shows a band of high echo intensity just below the freezing level, the other a column structure. Flight observations confirm that the band of high echo intensity is due to the melting of ice particles falling past the 0°C isotherm. Other radar bands were observed forming at heights in the atmosphere where the temperature is near -16°C. The properties of these bands are described and it is concluded that they are due to the spontaneous freezing of relatively large drops in the cloud. Ice and snow particles are not involved in the formation of column-type echoes.

SIP U6926

Elenevskiĭ, V. V.
CONSTRUCTION STABILITY IN PERMAFROST. (Ustoĭchivye konstrukt͡sii v usloviĭakh vechnoĭ merzloty; Text in Russian). Transportnoe Stroitel'stvo, 4, No. 11:17-18 incl. diagrs. 1934.
DLC, HE7.T7, v. 4

The principles and function of a protective seal for foundations in permafrost are explained. Adfreezing and heaving forces are localized by introducing artificial layers to prevent foundation cracking. A pitch-soaked gravel layer 0.5 m. wide and 0.9 m. from the foundation is suggested.

SIP U6927

Horton, Robert E.
THE MEASUREMENT OF RAINFALL AND SNOW. J. New Engl. Water Works Assoc. 33:14-71 incl. tables, graphs, map, diagrs. discussion, March 1919. [10] refs.
DLC, TD201.N53, v. 33

Methods of measuring precipitation are discussed and methods of increasing the accuracy of these measurements are suggested. Tables indicate the results of Hellmann's comparison of rain gages, the Philadelphia and Ithaca rain-gage experiments, and similar experiments in England. The defects of snow gages and measurements with the Mt. Rose and Kadel snow samplers are described. A special form of overflow can was devised for use as a snow sampler by equipping the mouth of the can with a reinforced cutting edge, and the closed end with a cock for air escape and drainage of meltwater. (See also SIP U6276)

SIP U6928

Sweden. Statens Offentliga Utredningar, Handelsdepartementet
CONSIDERATIONS WITH SUGGESTIONS ON CONDUCT OF THE STATE'S ICE-BREAKER ACTIVITY. (Betänkande med förslag till ornande av statens isbrytningsverksamhet; Text in Swedish). Statens Offentliga Utredningar, No. 53. 343p. incl. illus. tables, 1942.
DLC, J406.R15, v. 53

Modern ice-breaker activity in Sweden is discussed. The data listed include information on ice conditions for each year from 1900-1941 in Swedish harbors with details on ice formation, dates when the harbors were ice-blocked and opened, number of days when closed and maximum thickness of ice. The time periods are given for each year from 1900-1942 when 17 harbors were closed. Data on thickness, types, duration of ice including information on navigation with or without ice breakers are given for 4 regions. Ice conditions on Gota River (1920-1941) and outside Vänersborg including opening and blocking dates of the canal are given.

SIP U6929

Austria. Hydrographisches Zentralbüro
THE SNOW CONDITIONS IN AUSTRIA DURING 1901-1950. PARTS I, II, III. (Die Schneeverhältnisse in Österreich im Zeitraum 1901-1950. Teil I, II, III; Text in German). Beiträge zur Hydrographie Österreichs, No. 25, 648p. incl. tables, 1952.
DWB, M78.46 A938s, pt. I, II, III

Each part is divided into various river basins and the data for each station within the basin are tabulated. The data consist of mean dates of initial snowfall, beginning and end of the snow cover, and beginning and end of the winter snow cover; mean values for the number of days with snow cover and the duration of the winter snow cover for days with snowfall, the sums of all the measured new-snow depths, and the maximum snow depth of each winter; the extreme values of all the foregoing data. All the values are based on individual decades, 25-yr. periods, and the longest period for which observations of the particular station existed.

SIP U6930

Switzerland. Eidg. Departement des Innern
THE AVALANCHE WINTER 1950/51. (Der Lawinenwinter 1950/51; Text in German). Veröffentlichung über Verbauungen No. 6, 157p. incl. illus. tables, graphs, maps, 1951. 14 refs.
SIPRE files, S-1139

The avalanche conditions and damages during the winter of 1950-51 in various Swiss cantons are discussed by separate authors. The weather and snow conditions of 1950-51 in the Swiss Alps, protective measures against avalanches, and the effect of snow and avalanches on Swiss railroads are described. Avalanche damages of 1950-51 are tabulated and compared with those of 1887-88.

SIP U6931

Gerecke, F.
THE TRAVEL-TIME CURVE. (Die Laufzeitkurve; Text in German). p.65-68 incl. table, graph. (In: Seismische Untersuchungen des Geophysikalischen Institutes in Göttingen. I. Messungen auf dem Rhônegletscher). Z. Geophysik, 8:65-71, 1932.
DWB, P Z48g, v. 8

The ice thickness of the Rhône Glacier was measured along 5 longitudinal and 1 transverse profile. The thicknesses of a specific profile as calculated by different methods are tabulated, and travel-time curves for longitudinal and transverse waves through the different media are presented.

SIP U6932

Müller, H. K.
AZIMUTH AND EMERGENCE ANGLE OF THE DISPLACEMENT OF P AND S. (Azimut und Emergenzwinkel der Verschiebung von P und S; Text in German). p.68-71 incl. tables, diagr. (In: Seismische Untersuchungen des Geophysikalischen Institutes in Göttingen. I. Messungen auf dem Rhônegletscher). Z. Geophysik, 8:65-71, 1932.
DWB, P Z48g, v. 8

Calculations are presented for the azimuth and emergence angle of the displacement of the longitudinal and transverse waves in the firn and tongue of the Rhône Glacier. One vertical and 2 horizontal seismographs were used for the measurements.

SIP U6933

Jakuschoff, P.
ANCHOR ICE. (Das Grundeis; Text in German). Z. Geophysik, 10:308-316 incl. illus. 1934. [30] refs.
DWB, P Z48g, v. 10

Various theories of anchor-ice formation are summarized and critically analyzed. All theories agree that the first cause of anchor- and frazil-ice formation is sufficient supercooling of the water. Barnes' and Altberg's theories are considered convincing and realistic. Anchor ice in rivers forms almost exclusively on clear, cold nights with cloudless skies; the ice rises predominantly in the early morning hours. The multiplicity of existing ice types is ascribed to the acting hydrological and thermodynamic factors which are responsible for cooling the water. (See also SIP U6476)

SIP U6934

v. Drygalski, E.
ANCHOR ICE. (Über Grundeis; Text in German). Z. Geophysik, 11:109-111, 1935. 2 refs.
DWB, P Z48g, v. 11

Water does not flow below the solid ice cover of rapidly freezing inland lakes in northern Greenland. The radiation of the lake bottom causes the formation of anchor ice which rises and attaches itself to the undersurface of the ice cover. This downward growth occurs under pressure which is caused by the volumetric expansion of the freezing water. Frazil ice was not observed.

SIP U6935

Wegener, Kurt
THE TEMPERATURE AT THE BOTTOM OF THE GREENLAND INLAND ICE. (Die Temperatur am Boden des grönländischen Inlandeises; Text in German). Z. Geophysik, 12:166-172 incl. graph, 1936.
DWB, P Z48g, v. 12

The formation of heat in a glacier due to friction is a function of elevation loss. The temperature increase in the ice with elevation is calculated. The heat current emanating from the earth (0.03°C /m.) is almost identical to the temperature gradient in solid ground, and cannot effect any changes in the temperature of the inland ice. A melting temperature of -1.2°C exists at the bottom of the ice. The temperature within the inland ice is plotted as a function of ice thickness. (See also SIP U2638)

SIP U6936

Mothes, Hans
SEISMIC THICKNESS MEASUREMENTS OF GLACIER ICE. (Seismische Dickenmessungen von Gletschereis; Text in German). Z. Geophysik, 3: 121-134 incl. tables, graphs, map, diagrs. 1927.
DWB, P Z48g, v. 3

Detonation waves, produced by exploding charges at distances of 25 m.-2 km., were recorded on the Hintereisferner (Oetztaler Alps) by means of a vertical seismograph and a microphone seismograph, both optically recording. Velocities of 3400 m./sec. for the longitudinal waves and 1600 m./sec. for the transverse waves were obtained. Reflections from the lower limit of the glacier ice were obtained a number of times and at distances of 250-1200 m. The reflections were used to calculate ice thicknesses along a 1.5-km. long longitudinal profile. The thicknesses are in good agreement with those found by H. Hess by a different method, indicating the utility and reliability of the new seismic methods.

SIP U6937

Mothes, H.
NEW RESULTS OF SEISMIC ICE THICKNESS MEASUREMENTS. (Neue Ergebnisse der Eisseismik; Text in German). Z. Geophysik, 5:120-144 incl. tables, graphs, maps, diagrs. 1929.
DWB, P Z48g, v. 5

Seismic ice-thickness measurements were made in July and Aug. 1928 on the Hintereisferner. An optically-recording vertical seismograph was used to record detonations at distances of 180-600 m. Mean propagation velocities obtained were 3600 m./sec. in the tongue ice and 3140 m./sec. in firn for longitudinal waves, and 1690 m./sec. and 1350

m./sec. respectively for transverse waves. Reflections of longitudinal waves at the lower limiting surface of the ice were recorded in 25 cases. These data were used for determining ice thicknesses. The theoretical results were confirmed by subsequent measurements in March 1929 on the Aletsch Glacier.

SIP U6938

Köhler, R.
OBSERVATIONS OF PROFILES ON SEA ICE. (Beobachtungen an Profilen auf See-Eis; Text in German). Z. Geophysik, 5:314-316 incl. graphs, 1929. 4 refs.
DWB, P Z48g, v. 5

The seismic wave velocities in ice under normal pressure were measured in a series of profiles on 30-cm. thick sea ice. Three space-waves with velocities of 3.2, 2.7 and 2.2 km./sec. were determined in anisotropic sea ice; values of 3.2 and 1.1 km./sec. were measured for isotropic sea ice. The velocity of the longitudinal waves under normal pressure was 3200 m./sec., and 1700 m./sec. for transverse waves. The modulus of thrust of ice as calculated from these velocities is 270×10^8 gm./cm. sec.^{2}, and Young's modulus 700×10^8 gm./cm. sec.^{2}.

SIP U6939

Borovik-Romanova, T. F.
SUPERCOOLING OF WATER DROPLETS. (Pereokhlazhdenie vodi͡anykh kapel'; Text in Russian with English summary). Trudy Leningradskogo Instituta Eksperimental'no͡i Meteorologii, 1:48-50, 114 incl. tables, 1937. 7 refs.
DLC, QC851.T78, v. 1

The dependency of water supercooling on the size of the droplets and the capillarity of the tubes was studied in the laboratory. Thermocouples with sensitive galvanometers were used to measure the temperature. The diameters of freezing droplets were measured by means of an ocular microscope. Water froze in capillary tubes, 1.57 mm. in diam. at -6.4°C, tubes 0.15 mm. in diam. at -14.6°C and those 0.06 mm. in diam. at -18.5°C. Droplets 2.1 mm. in diam. froze near -9.6°C; those 1.23 mm. in diam. near -10.9°C and droplets 0.66 mm. in diam. at -11.35°C.

SIP U6940

Tokmachev, S. M.
POLARIMETRIC CHARACTERISTICS OF THE ATMOSPHERE. (Poli͡arimetricheskai͡a kharakteristika tumanoobrazuiu͡shcheĭ sredy; Text in Russian with English summary). Trudy Leningradskogo Instituta Eksperimental'no͡i Meteorologii, 1:5-47, 114 incl. illus. tables, graphs, diagrs. 1937. 37 refs.
DLC, QC851.T78, v. 1

Observational data obtained in 1934 at an elevation of 920 m. in the Caucasus Range are tabulated and the dependence of polarization on weather conditions is discussed. Cornel's photopolarimeter and Savarre's polariscope were used for measurements. Decreased polarization observed during cloudiness was analyzed and compared with data observed in 1921 at Leningrad from an airship. The polarization of light reflected from clouds and the snow cover was measured to obtain these data. It was found that snow cover considerably decreased polarization. The presence of snow cover reduced the polarization of white light from 71-76% near sunset to 55-57%. The coefficient of reflectivity of the snow cover was 76%; that of a snow-free soil surface was 7-31%.

SIP U6941

Shostakovich, V. B.
CLIMATE OF YAKUTSK AND ADJACENT PARTS OF NORTHERN ASIA. (Materialy po klimatu Yakutskoĭ respubliki i sopredel'nykh s neĭ chasteĭ Severnoĭ Azii; Text in Russian with German summary). Trudy Komissii po Izucheniu Yakutskoĭ Avtonomnoĭ Sovetskoĭ Sotsialisticheskoĭ Respubliki, 6:1-156 incl. tables, maps, 1927. 2 refs.
DLC, DK771.Y2A17, v. 6

Data of meteorological observations made during 1789-1923 at 39 stations are tabulated. The stations are located between 53°-73.5° N. lat. and 65°-177° E. long. at elevations between 4-1020 m. Monthly and annual variations of the main elements are discussed and their normals mapped. Snowfall for most of Yakutsk is below 20 mm., representing 10-15% of the annual precipitation.

SIP U6942

Sorge, Ernst
THE FIRST THICKNESS MEASUREMENTS OF THE GREENLAND INLAND ICE. (Die ersten Dickenmessungen des grönländischen Inlandeises; Text in German). Z. Geophysik, 6:22-31 incl. tables, graphs, map, diagr. 1930. 1 ref.
DWB, P Z48g, v. 6

A total of 22 detonations were released in Aug. 1929 on the Greenland inland ice at 4 locations. The detonation waves were optically recorded with a vertical seismograph. The ice thickness at the 4 locations was determined by the reflection of longitudinal waves at the lower limit of the ice. The method was found to be applicable in the firn area and with greater ice thicknesses. A thickness of 1200 m. was measured at an elevation of 1570 m. (See also SIP U3283)

SIP U6943

Drockamp, B. and H. Mothes
SEISMIC INVESTIGATIONS ON THE PASTERZE GLACIER. I. (Seismische Untersuchungen auf dem Pasterzegletscher. I; Text in German). Z. Geophysik, 6:482-500 incl. tables, graphs, map, 1930. 9 refs.
DWB, P Z48g, v. 6

Seismic ice measurements made on the Pasterze Glacier in Aug. 1929 are described. The elasticity

coefficients of glacier ice were calculated from the mean velocities of the longitudinal (3580 m./sec.) and transverse waves (1670 m./sec.). A modulus of elasticity of glacier ice of 692 kg./sq. mm. was obtained. (See also SIP U5753)

SIP U6944

Brockamp, B.
SEISMIC INVESTIGATIONS ON THE PASTERZE GLACIER. II. (Seismische Untersuchungen auf dem Pasterzegletscher. II; Text in German). Z. Geophysik, 7:232-240 incl. tables, graphs, 1931. 3 refs.
DWB, P Z48g, v. 7

Amplitudes, amplitude relationships and periods of the different waves are discussed and analyzed. (See also SIP U6943)

SIP U6945

Forschungsanstalt Graf Zeppelin, Stuttgart-Ruit
SNOW COMPACTION INVESTIGATIONS. (Untersuchungen zur Schneeverfestigung; Text in German). Pt. I: Comprehensive Final Rept. 22p. incl. illus. tables, diagrs. Oct. 5, 1942. 2 refs. (Photostat)
SIPRE files, S-2337

Laboratory and field research in compacting snow on runways, which forms the basis for the creation of suitable compaction apparatus is discussed. Snow structure and metamorphism, strength characteristics, consolidation and compaction experiments, and suggestions for producing a snow runway on the basis of experimental results are described. Results show that snow at average and not too low air temperatures can be mechanically compacted (rotary plows, hand plows) to a bearing capacity sufficient to carry airplanes. Steam, water or diluted solutions must be added and the snow must be subsequently rolled at low temperatures. The estimated fuel consumption is 2 tons of coal for each 10,000 sq. m. of rolled area for both water or steam additions.

SIP U6946

Fuchs, A.
EXPERIMENTS ON CONSOLIDATION OF LOOSE SNOW BY COMPACTION AS A FUNCTION OF TEMPERATURE. (Versuche über Verfestigung von Lockerschnee durch Zusammendrücken in Abhängigkeit von der Temperatur; Text in German). Versuchsber. 8, Ber. No. 241, Forschungsanstalt Graf Zeppelin, Stuttgart-Ruit, 6p. incl. tables, graphs, [1942]. (Photostat)
SIPRE files, S-2338

Loose snow was variously compacted at temperatures of -2° to -38°C and the attained shear strength was measured. The snow was filled into a 9.33-sq. cm. tube, compacted, and sheared after 11-15 hr. The consolidation by metamorphism during the time between compaction and shearing was deducted from the shear strength. Results indicate that in the pressure range between 0-50 kg./sq. cm. at constant temperature a linear relationship exists between pressure and ultimate shear strength. The relationship is non-linear at pressures above 50 kg./sq. cm. Snow at higher temperatures possesses greater shear strength at equal pressures. The shear strength of densely compacted snow is probably a function of the specific grain-bonding area. This area can be calculated as a function of the shear strength of snow divided by that of ice.

SIP U6947

Fuchs, A.
CONSOLIDATION OF LOOSE SNOW BY METAMORPHISM AS A FUNCTION OF TEMPERATURE, TIME AND GRAIN FORM. (Über Verfestigung von Lockerschnee durch Metamorphose in Abhängigkeit von Temperatur, Zeit und Korngestalt; Text in German). Versuchsber. 2, Ber. No. 241, Forschungsanstalt Graf Zeppelin, Stuttgart-Ruit, 16p. incl. illus. tables, graphs, [1942]. (Photostat)
SIPRE files, S-2339

Loose, recrystallized, spring wet snow was separated into a fine fraction with predominantly sharp-edged grains and a coarse fraction with rounded grains. The shear strength of these 2 fractions and that of the combined fractions was determined by compacting the snow into 400-cc. test tubes and shearing the cylinders along the cross section normal to the axis. Results indicate a maximum consolidation near -4°C which rapidly decreases towards 0°C and gradually decreases with falling temperatures. Snow with sharp-edged grain fractions consolidates much more than snow with predominantly rounded grains. Maximum consolidation is attained earlier in samples of lesser strength. Snow with more sharp-edged grains consolidates relatively more at lower temperatures than snow with more round grains.

SIP U6948

Isaachsen, I.
TREACHEROUS SEA ICE. (Lumsk sjøis; Text in Norwegian). Naturen, 42:117-122, 1918. 2 refs.
DLC, Q4.N15, v. 42

Surface ice in narrow inlets of Norwegian fjords often melts suddenly where the pocket-like sea bottom traps warm salt water or where fresh surface water occurs. The frozen fresh water melts quickly when coming in contact with the warmer salt water from below.

SIP U6949

Reusch, Hans
SOMETHING NEW ABOUT GLACIERS. (Noget nyt om isbræer; Text in Norwegian). Naturen, 44:377-378, 1920.
DLC, Q4.N15, v. 44

A floating glacier in McMurdo Sound (Antarctica) freezes to the ocean bottom each winter. Melting in summer tears the mass from the bottom. Alternate freezing and thawing eventually bring bottom

deposits to the ice surface. It is suggested that this process may explain the presence of shells in clay under moraine gravel in Norway.

SIP U6950

Al'tberg, V.
PHYSICAL CONDITIONS OF ANCHOR-ICE FORMATION. (O fizicheskikh usloviíakh obrazovaniía donnogo l'da; Text in Russian). Meteorologicheskiĭ Vestnik, 30:159-185, 1920.
DWB, M(05) R969me, v. 30

Theories concerning anchor-ice formation are reviewed and discussed. The physical processes of water cooling and warming and conditions favorable to change liquid water into a solid are analyzed. Crystallization occurs when the whole water mass is in a supercooled state. Ice appears first in river areas having maximum heat losses. The stationary water layer near the river bottom is responsible for initial anchor-ice formation. Laboratory experiments showed that continued growth of anchor ice is effected by the influx of supercooled water.

SIP U6951

Al'tberg, V.
WATER SUPERCOOLING AND DISTRIBUTION OF RIVER TEMPERATURES. (K voprosu o pereokhlazhdenii vody i raspredelenii temperatury v reke; Text in Russian). Meteorologicheskiĭ Vestnik, 32:13-23 incl. tables, 1922. 6 refs.
DWB, M(05) R969me, v. 32

Observations of water near the f.p. made in rivers and laboratories are reviewed and discussed. Temperature data of the Neva River from 1905-06 are tabulated. Water supercooling from -0.005° to -0.18°C was observed in many parts of Europe and Asia. Experiments in the Central Physical Observatory showed results analogous to those obtained under natural conditions. External conditions and degree of mixing determined the degree of supercooling. Maximum supercooling was observed immediately before the appearance of the first ice crystals. Minimum supercooling occurred near rapids. Barnes observed this phenomenon near the rapids of the St. Lawrence River.

SIP U6952

Kalitin, N. N.
INFLUENCE OF CLOUDINESS ON THE BRIGHTNESS OF THE EARTH'S SURFACE DUE TO DIFFUSED LIGHT IN THE ATMOSPHERE. (Einfluss der Bewölkung auf die Helligkeit der Erdoberfläche durch diffuses Licht der Atmosphäre; Text in German). Strahlentherapie, 39:717-728 incl. illus. tables, graphs, 1930-31. 3 refs. (Photostat)
SIPRE files, S-2270

Data obtained by a recording photoelectric photometer for 4 yr. are analyzed. The mean brightness due to diffused atmospheric light is tabulated as a function of cloudiness (0-10) and solar altitude (7°, 15°, 30°, 45°) for various cloud types and with and without snow cover. The presence of a snow cover increases the brightness 28% and 11% respectively for 7° and 45° solar altitude and a cloudless sky. The maximum snow-cover influence is obtained in the presence of low clouds; the mean brightness is increased 184% in the presence of nimbus clouds and a solar altitude of 30°.

SIP U6953

Tol'skiĭ, A.
THE CLIMATE OF CONIFEROUS PLANTINGS AT THE BUZULUK FORESTS OF SAMARA PROVINCE. (Klimat sosnovykh nasazhdeniĭ Buzulukskogo bora Samarskoĭ gub.; Text in Russian). Meteorologicheskiĭ Vestnik, 28:77-104 incl. tables, 1918. 11 refs.
DLC, QC851.M5, v. 28

The climatic peculiarities of coniferous forests were investigated from 1904-1910. Mean and extreme data are tabulated and discussed. The mean duration of the snow-cover period was 156.5 days in the forest and 150.9 days in the fields. The mean snow-cover depth was less in the forest (27.7 cm.) than in the fields (31.4 cm.) because the trees retained about 18% of the winter precipitation. The snow density was higher in fields due to wind compaction. Snow melting was slower in the forest due to lower air temperatures.

SIP U6954

Golubeva, L. A.
CLIMATIC OUTLINE ACCORDING TO THE DATA OF THE SARATOV METEOROLOGICAL STATION. (Klimaticheskiĭ ocherk po Saratovskoĭ metstantsii; Text in Russian with English summary). Sotsialisticheskoe Zernovoe Khozíaĭstvo (Saratov), 6, No. 1: 104-131 incl. tables, 1936. 4 refs.
DLC, Slavic unclassified

Monthly climatic data for each year from 1912-1933 are tabulated and discussed. Winter precipitation in the Saratov region measured through snow surveys indicated that the gage equipped with a Nipher shield collected only about 69% of the snow precipitation. The snow cover usually lasts from Nov. 24-April 4 and the mean maximum depth is about 24 cm. in early March. Snow densities of 0.16-0.17 in early winter increase to 0.35-0.38 in March-April. The soil is usually frozen to a depth of 1.1 m. A minimum soil temperature of -3.5°C was recorded at a depth of 1 m.

SIP U6955

Kabanov, P. G.
THE PROBLEM OF SNOW ACCUMULATION IN SARATOV PROVINCE. (Voprosy snegonakoplenniía v Saratovskoĭ oblasti; Text in Russian). Sotsialisticheskoe Zernovoe Khozíaĭstvo (Saratov), 6, No. 4:66-72 incl. tables, 1936.
DLC, Slavic unclassified

Snowdrifting in relation to snowstorm frequency and effectiveness of snow retention measures is analyzed.

Snowstorms occur on an average of 19-22 days and snowdrifting on 5-8 days. The snow cover is too scanty (average maximum 20-25 cm.) for retention over the entire cultivated area. Snow retention can be practiced only in 30% of the territory. Early erection of snow fences is recommended for snow retention. Snowbanks were inefficient measures.

SIP U6956

Reinicke, Richard
THE FUNDAMENTAL MOLECULAR STRUCTURE OF THE WATER DROPLET AND ITS RELATIONS TO THE WERNER COORDINATION THEORY IN GENERAL AND TO THE CRYSTAL STRUCTURE OF WATER IN PARTICULAR. (Über die molekulare Urgestalt des Wassertropfens und ihre Beziehungen zur Werner'schen Koordinationslehre im allgemeinen sowie zur Kristallwasserstruktur im besonderen; Text in German). Z. anorg. u. allgem. Chem. 187: 49-59 incl. diagrs. 1930. 20 refs.
DLC, QD1.Z4, v. 187

A structure for aggregates of water molecules is proposed which shows a possible relationship to the crystal structure of ice. The fundamental unit is a regular octahedron, incorporated into a structure of hexagonal form. The association of water in the liquid state is related to this configuration.

SIP U6957

Boyle, R. W. and G. B. Taylor
REFLECTING POWERS OF VARIOUS MATERIALS FOR ULTRASONIC WAVES. Trans. Roy. Soc. Can. 3d Ser. 20, Sec. 3:245-257 incl. illus. tables, diagrs. 1926. 3 refs.
DLC, AS42.R6, v. 20

Theoretical and experimental considerations of the reflection of extremely short sound waves in water from steel, granite and ice are presented. A quantitative indication of the comparative strength of the reflected energies is obtained by fixing the frequency of emission and allowing the ultrasonic beam to fall perpendicularly on various reflectors and observing the minimum voltage of excitation at which standing waves will just be found. The standing waves were observed on the floor of a tank by means of powdered-coal cinders. Ice in water is a very weak reflector in comparison with the other 2 materials. A comparison of the relative energies to produce standing waves and the calculated ratios of reflecting power indicates that ice has a somewhat greater reflecting power than was expected from the doubtful constants of elasticity.

SIP U6958

Vize, V. Ĭu.
CLIMATE OF YAKUTSK. (Klimat Ĭakutii; Text in Russian). p.(241)-(273) incl. tables, graphs, maps. (In: Ĭakutiĭa, ed. by P. V. Vittenburg, Leningrad, Izd-vo Akademii Nauk SSSR, 1927). 23 refs.
DLC, DK771.Y2V5, 1927

Average and extreme climatic data are tabulated and discussed. The ice conditions in the Laptev Sea are compared with summer air temperatures in Verkhoyansk, Yakutsk and Olekminsk. The results indicate a close correlation between temperature deviations from norms and the degree of sea icing. The snow cover in Yakutsk reached a maximum depth of 21-34 cm. in March-May. The deepest cover was observed in the lower section of the Kolyma River. Scant snow is usual along the coast of the Laptev Sea. Extreme low temperatures together with a scant snow cover produce permafrost throughout Yakutsk.

SIP U6959

Molodykh, I. F.
COMMUNICATION IN YAKUTSK. (Puti soobshcheniĭa Ĭakutii; Text in Russian). p.(575)-(661) incl. tables, maps, diagrs. (In: Ĭakutiĭa, ed. by P. V. Vittenburg, Leningrad, Izd-vo Akademii Nauk SSSR, 1927). 29 refs.
DLC, DK771.Y2V5, 1927

Communication and its dependence on climatic factors are analyzed and discussed. Dirt roads are difficult to construct in permafrost regions because of swamps, lakes, frost heavings and naleds. Waterways are the principal means of communication in Yakutsk even in winter. Data on freeze-up and breakup of the main rivers of Yakutsk are tabulated. Navigation was halted on the Lena River for an average of 182 days (54° N. lat.) - 238 days (72° N. lat.). The maximum ice thickness was about 100 cm. in the south and 235 cm. in the northern sections of the river. Navigation was impossible on the Aldan, Vilyui, Olekma rivers for 199-218 days when ice reached maximum thicknesses of 120-230 cm.

SIP U6960

Grigor'ev, A. A.
GEOMORPHOLOGICAL OUTLINE OF YAKUTSK. (Geomorphologicheskiĭ ocherk Ĭakutii; Text in Russian). p.(39)-(51) incl. illus. map. (In: Ĭakutiĭa, ed. by P. V. Vittenburg, Leningrad, Izd-vo Akademii Nauk SSSR, 1927). 45 refs.
DLC, DK771.Y2V5, 1927

The geomorphology of Yakutsk ASSR is outlined. The relief of large river valleys is relatively smooth because snow-melt erosion is negligible. Fossil ice consists of a strata of firn ice (20 m. thick) and one of lake ice (3-4 m. thick), indicating 2 formation stages. Tundra is characterized by frost cracks, numerous lakes and karst formations. Underground veins of pure ice are of recent formation and are indicative of severe climatic conditions and the presence of permafrost.

SIP U6961

Hoagland, D. R.
THE FREEZING-POINT METHOD AS AN INDEX OF VARIATIONS IN THE SOIL SOLUTION DUE TO SEASON AND CROP GROWTH. J. Agr. Research, 12:369-395 incl. illus. tables, graphs, Feb. 11, 1918. 9 refs.
DLC, S21.A75, v. 12

Freezing-point depressions and moisture content were determined on 13 soils under a variety of conditions to estimate the amount of unfree water in the soil. The data permit calculation of the amount of moisture that must be subtracted from the total in order that the percentages of free water give the same ratios as the f.p. depression. Incubation and CO_2 lowered the f.p. depression; drying and remoistening had no consistent effect on the f.p. depression; leaching raised the f.p. depression. Total solids in soil solution were calculated by the f.p. and extraction methods and the results are tabulated. **(See also SIP U660)**

SIP U6962

Fuchs, Alfred
THE SHEAR STRENGTH OF SNOW AND ICE AS A FUNCTION OF TEMPERATURE. (Die Scherfestigkeit von Schnee und Eis in Abhängigkeit von der Temperatur; Text in German). Veröffentl. Museum Ferdinandeum Innsbruck, 26:101-105 incl. graphs, 1946. 3 refs.
DLC, DB761.I63, v. 26

Cylindrical samples of regelated, wet spring snow, 9.33 sq. cm. in cross section and of various densities, were subjected to temperatures down to -77°C, and were sheared along the cross section normal to the cylinder axis. Results show that the shear strength at first increases rapidly with decreasing temperature and subsequently increases at a much slower rate. The shear strength in the temperature range between -0.5° to -20°C may be approximately expressed as an exponential function. The shear strength of ice behaves exactly like that of snow as a function of temperature. It is assumed that the shear strength of snow is a function of grain bonding. (See also SIP U6946)

SIP U6963

Henke
ICE BLASTING ALONG THE COAST AND BLASTING TESTS WITH THERMIT. (Eissprengungen an der Küste und Versuchssprengung mit Thermit; Text in German). Z. ges. Schiess.-u. Sprengstoffw. 25: 62-63 incl. diagr. Feb. 1930. (Photostat)
SIPRE files, S-1113

Ice, 20-60 cm. thick, endangered a bridge, 500 ft. long along the Baltic Sea coast. A channel 900 m. long was blasted southeast of the bridge and another 600 m. long and 2 m. wide was blasted northeast of the bridge. A charge of 2 explosive units was most effective for a 2-m. channel width and had a strong penetrating effect through packed snow when placed half-way through the ice. The distance between charges was 4-5 m., and limiting furrows of 30 cm. width were cut with ice axes. Another operation described consisted of blasting ice 80 cm. thick underlain by loosely consolidated floes and slush ice. A furrow 175 m. long and 9 m. wide was cut in the ice and safety-fuse priming was used. Nonuniform detonation was most efficient. A 25-kg. Thermit bomb melted a 30-cm. hole in the ice, but did not affect the ice below.

SIP U6964

Reinhard, H.
THE EXTENT AND ICING OF PEAT BOGS IN WHITE RUSSIA (RUTHENIA). (Über die Verbreitung und Vereisung der Torfmoore in Weissruthenien; Text in German). Z. angew. Meteorologie, 60: 33-42 incl. tables, maps, 1943. 6 refs.
DWB, P Z48a, v. 60

Frost penetrates on the average only the upper 15-20 cm. of upland moors; depths of 30-40 cm. are attained in lowland bogs. Frost-penetration depths of 1 m. or more were observed during severe and snow-poor winters. The speed of thaw is 0.4-0.5 cm./day in relatively dry moors, 0.65 cm./day in forested moors, and 0.2-0.5 cm./day in wet moors. Isolines of mean Nov. and Dec. temperatures, beginning and end of winter, and the beginning and end of a stable snow cover in central Russia are plotted. **(See also SIP U6315)**

SIP U6965

Wegener, Kurt
THE CONVERSION OF ENERGY DURING THE FORMATION OF WATER AND ICE IN THE ATMOSPHERE. (Der Energie-Umsatz bei der Entstehung von Wasser und Eis in der Atmosphäre; Text in German). Z. angew. Meteorologie, 60:133-137, 1943.
DWB, P Z48a, v. 60

Condensation nuclei of ice crystals in the air are assumed different from those of water droplets because meltwater from snow and glacier ice has a different electrical conductivity than rain water. The formation of ice crystals in the atmosphere at temperatures much below 0°C indicates their origin from freezing water and not sublimation. The foregoing hypothesis is not valid because the maximum vapor pressure above ice is smaller than that above water; ice is just as hygroscopic as a salt nucleus without the hygroscopicity of the crystal being decreased by crystal growth in contrast to a water droplet. A single salt nucleus is sufficient to form the largest snowflake. The number of necessary salt nuclei/unit volume of ice and meltwater is small in comparison to an equal volume of rain water. This fact explains the difference in electrical conductivity.

SIP U6966

Sauberer, Franz
SNOW COVER CONDITIONS AT THE ZENTRALANSTALT FÜR METEOROLOGIE UND GEODYNAMIK IN VIENNA. (Zur Kenntnis der Schneedeckenverhältnisse an der Zentralanstalt für Meteorologie und Geodynamik in Wien; Text in German). Jahrb. Zentralanstalt Meteorologie Geodynamik (Vienna), N. S. 83, No. 157:D8-D17 incl. tables, graphs, maps, 1946. 7 refs.
DWB, Unclassed

The duration of the snow cover for the period 1905-1945, the first and last days with snow cover, and the deviations of the annual duration from the 40-yr. mean are tabulated. A clear parallelism exists between winter temperatures and duration of the snow cover. Snow-depth maxima, days with specific snow depths, new-snow amounts and depths are tabulated. Weather conditions existing during heavy snowfalls are analyzed.

SIP U6967

Toperczer, M.
THE GROUND TEMPERATURES IN VIENNA 1911-1944. (Die Bodentemperaturen in Wien 1911-1944; Text in German). Jahrb. Zentralanstalt Meteorologie Geodynamik (Vienna), N. S. 83, No. 157:D36-D47 incl. tables, graphs, 1946.
DWB, Unclassed

Monthly and annual ground-temperature means at depths of 0.52, 0.98, 1.93, 2.88, and 3.77 m. for 1911-1940, and corresponding values for thermometers at the ground surface and at depths of 2 and 5 cm. for 1926-1940 are tabulated. The annual mean of the surface temperature exceeds that of the air temperature by 1.51°C. The annual course of the temperature gradient in the individual layers, a harmonic analysis, temperature conductivity (area/time), average monthly variations of the daily temperature mean at various depths, and extremes are discussed. Frost penetrated to a maximum depth of about 80 cm. in the presence of an undisturbed snow cover. As a general rule, the frost limit penetrates 5 cm. for every 10 days duration after the frost has penetrated to 50 cm.

SIP U6968

Al'tberg, V.
ON ANCHOR ICE. (O donnom l'de; Text in Russian). Meteorologicheskiĭ Vestnik, 27:85-90, 1917. 6 refs.
DLC, QC851.M5, v. 27

Conditions accompanying anchor ice formation are described and theories explaining the phenomenon are reviewed. The amount of anchor ice depends on air temperatures, cloudiness, wind velocity and other factors influencing the heat balance of water reservoirs. Anchor ice forms in running water when the entire water mass is supercooled. A high flow rate favors the formation of large amounts of anchor ice.

SIP U6969

Nebol'sin, S.
NORMAL FREQUENCY OF PRECIPITATION IN EUROPEAN RUSSIA. (Normal'naîa povtoriaemost' atmosfernykh osadkov v Evropeĭskoĭ Rossii; Text in Russian). Meteorologicheskiĭ Vestnik, 27:172-180 incl. tables, 1917.
DLC, QC851.M5, v. 27

Data of precipitation frequency in 52 provinces of European Russia are tabulated on a monthly basis from 1893-1912. Snow precipitation in winter was as frequent as rain precipitation in summer. Snow precipitation was most frequent in the northern provinces reaching 15-17 days in Jan.

SIP U6970

Chukalin, S. G.
EXPERIMENTS WITH SNOW DURING 1934. (Opytnaîa rabota po snegu v 1934 godu; Text in Russian). Sotsialisticheskoe Zernovoe Khozîaĭstvo (Saratov), 4, No. 5:64-67 incl. tables, 1934. 1 ref.
DLC, Slavic unclassified

Snow deposits around fences were investigated in the Saratov region during the winter of 1933-34. Snow fences placed perpendicular to the wind direction accumulated drifts higher than the mean depth of the snow cover. Snow fences placed parallel to the direction of the wind accumulated less snow than perpendicularly placed fences, and often less than the mean depth of the snow cover.

SIP U6971

Poznyshev, O. S.
INSTRUMENT FOR THE MEASUREMENT OF SNOW EVAPORATION. (Pribor dlîa issledovaniîa isparenîa snega; Text in Russian with German summary). Sotsialisticheskoe Zernovoe Khozîaĭstvo (Saratov), 4, No. 5:68-75 incl. tables, diagr. 1934. 1 ref.
DLC, Slavic unclassified

A beam balance with 2 containers is inserted in a white, iron box open at the top, and placed on the ground or in a snow cover. One container is filled with snow and the other serves as a control for determining new precipitation. Thermocouples are inserted in the bottom of each container. A major portion of a deep snow cover may evaporate in the southeastern part of European USSR, particularly near the end of winter under anticyclonic conditions.

SIP U6972

Ponomarev, V. M.
HYDROGEOLOGICAL OUTLINE OF THE AMDERMA REGION. (Gidrogeologicheskiĭ ocherk Amderminskogo raîona; Text in Russian). Leningrad, Izd-vo Glavsevmorputi, 1937, 56p. incl. illus. tables, graphs, maps, diagrs. 10 refs.
DLC, Slavic unclassified

The region was studied during Jan. 1934-Aug. 1935. The area is in a permafrost region and is subjected to intensive frost heaving, ice-mound formations, and other permafrost phenomena. Soil composition and the condition of the soil surface determine the depth of the active layer, which was not deeper than 0.5 m. under peat. Clay soil thawed to a depth of 0.8 m., and sandy soil to 1.6 m. The active layer was as deep as 3.4 m. in rocks. Boring indicated a decrease of temperature with depth. A temperature of -4.5°C was measured at a depth of 216 m.

SIP U6973

Waterways Experiment Station
FREEZING TEST ON SOIL. Misc. paper No. 3-15 11p. incl. table, Aug. 1952.
ASTIA, AD 10353

The progressive freezing of a wet soil mass was studied with 2 earth-pressure cells and a compression dynamometer placed in an 18-in. soil-filled cubical box. The time-temperature curves showed an initial temperature drop which was most pronounced near the soil surface, a gradual drop until the temperature reached about 32°F, and then a distinct drop of at least 1°-2°F; freezing was indicated by a leveling of the curve at about 32°F, which continued until the soil was completely frozen. Freezing started at successively later times with increasing depth from the surface. The pressure-measuring devices, particularly the vertical-pressure cell and the dynamometer, apparently reflected the passage of the freezing line. However, conditions were not comparable to those obtained in the field; the devices would be satisfactory only when oriented vertically and installed at depths greater than about 5 ft. (ASTIA abstracts)

SIP U6974

Halicki, Bronisław
GLACIERS. (O lodowcach; Text in Polish with French summary). Wiadomości Muzeum Ziemi, 4: 77-111 incl. illus. table, diagrs. 1949. 6 refs.
DLC, QE1.W27, 1949

Factors essential for the life of glaciers are analyzed. The accretion and ablation balance and motion cycles of glaciers in high mountains and polar regions are discussed. The snow line varies in height from 0 in Greenland and 500 m. in Spitsbergen to 3000 m. in the Alps. The formation of glacier ice with a gradual increase of density is described. Ablation may be superficial, internal or subglacial. The glaciation process in the Austrian Alps and Spitsbergen is illustrated.

SIP U6975

Norinder, Harald and Reinhards Siksna
ON THE ELECTRIFICATION OF SNOW. Tellus, 5: 260-268 incl. tables, graphs, diagrs. Aug. 1953. 14 refs.
DLC, QC801.T4, v. 5

The electrification and resistivity of snow were investigated by measuring the charge on snow when pouring it from vessels into funnels of different materials, the charge on an insulated target on which snow was blown and the charge of the scattered snow, and the charge in the air with blowing snow. The resistivity of the snow varied from 15-2600 x 10^6 ohm cm. depending on the density. The charge of larger snow particles was dependent on the temperature and on the material of the target. Ion counters were used to measure the presence of separated and charges of both polarities in air. The maximum value of the positive space charge or net charge was of the order of 0.5 x 10^{-5} e.s.u./cu. cm. The conditions under which the positive or negative charge predominates could not be determined. The charges may be attributed to very small snow particles in air.

SIP U6976

Dufour, Louis and Raymond Defay
THE FORMATION OF CONDENSATION AND SOLIDIFICATION GERMS AROUND AN INSOLUBLE, SOLID NUCLEUS. (Sur la formation des germes de condensation et de solidification autour d'un noyau solide insoluble; Text in French with English summary). Tellus, 5:293-301 incl. tables, diagrs. Aug. 1953. 13 refs.
DLC, QC801.T4, v. 5

Solid insoluble nuclei help the formation of water or ice inasmuch as the adhesion coefficient of water or ice on the solid be positive. If this coefficient is greater than 1 and if the solid nucleus is great enough this effect may be sufficient to render null the free energy of formation of germs and to provoke the condensation or the solidification without germ. These effects can be calculated a priori, assuming a certain degree of saturation of the atmospheric water vapor provided the suitable adhesion coefficient is known. (Authors' abstract)

SIP U6977

PUBLICATIONS ON SNOW, FIRN AND ICE, ETC. (Veröffentlichungen über Schnee, Firn und Eis etc.; Text in German). Bibliothek S. L. F. (Davos), 8p. [1947]. (typed ms.)
SIPRE files, S-1475

Approximately 210 references to reports, journal articles and books are listed by author and title only. The entries are arranged alphabetically by author.

SIP U6978

Johnstone, J. H. L.
THE ELECTRICAL RESISTANCE AND TEMPERATURE COEFFICIENT OF ICE. Proc. Trans. Nova Scotian Inst. Sci. 13:126-144 incl. tables, graphs, diagrs. 1911-12. 5 refs.
DLC, Q21.N9, v. 13

The specific resistance of ice at temperatures from 0° to -19°C was determined by measuring the poten-

tial drop through ice with a steady current. The current was measured by a Dolezalek electrometer, and the voltage was measured by a Wilson tilting electroscope. The specific resistance values obtained ranged from 0.0367×10^9 ohms at 0°C to 4.13×10^9 ohms at -19°C. The temperature coefficient of the resistance of ice was determined at different temperatures by dividing the cotangent of the temperature-resistance curve by the resistance of the ice. The values of the coefficient are greater than those of ordinary electrolytes, and decrease with decreasing temperatures.

SIP U6979

Amberg, C. R. and L. E. Williams
ROCK SALT FOR ICE AND SNOW CONTROL. Bull. Ceramic Res. Dept. N. Y. State Coll. Ceramics Alfred Univ. No. 3:3-42 incl. illus. tables, graphs, diagrs. 1948.
DLC, TP790.N48, No. 3, 1948

The variables which influence the effectiveness of rock salt when used for snow and ice removal were investigated. Laboratory experiments were made on the effects of particle size on the rate of melting and the depth of penetration, and the progress of melting when a salt crystal was in contact with ice was photographed. Field studies were conducted on roads under actual winter conditions. Results show that fine particles tend to melt ice and snow more rapidly than coarse particles; coarse particles are slower in action but tend to penetrate greater thicknesses; a mixture of particle sizes may be warranted for general use. The amount of traffic, the manner in which the salt is spread and the amount of salt used per mile are factors which appreciably affect the melting action. Salt-application equipment and storage requirements are suggested.

SIP U6980

Bastamov, S. L.
LABORATORY STUDY OF SNOWDRIFTING AT THE GEOPHYSICAL OBSERVATORY AT KUCHINO. (Laboratornoe izuchenie snezhnykh zanosov v geofizicheskoĭ observatorii v Kuchino; Text in Russian). Trudy Nauchno-Issledovatel'skogo Upravleniĭa Narodnogo Komissariata Puteĭ Soobshcheniĭa, 109: 75-76, 1930.
DLC, Slavic unclassified

Research conducted from 1918 is briefly reviewed. Artificial snowstorms were produced in the laboratory to study the aerodynamic properties of various snow fences used by railroads for snowdrift prevention. An instrument suggested by Kuznetsov for measuring snowdrifting intensity can be used to improve the construction design of Sabinin. An instrument was developed by P. A. Gusev to determine snow-cover mobility.

SIP U6981

Smirnov, I. V.
SNOW DEPOSITS BY ARTIFICIAL AND NATURAL SNOWSTORMS AND MEASUREMENTS OF THE DRIFTED SNOW. (O znezhnykh otlozheniĭakh i usloviĭakh iskusstvennoĭ i estestvennoĭ meteli i o rabote metelemerov; Text in Russian). Trudy Nauchno-Issledovatel'skogo Upravleniĭa Narodnogo Komissariata Puteĭ Soobshcheniĭa, 109:79-85, 1930.
DLC, Slavic unclassified

The results of laboratory experiments with model snow fences and roadbeds are discussed. The snow deposit around snow-fence models in a pipe 120 cm. in diam. with air speeds of 8 m./sec. was similar to the formations observed under field conditions. Experiments confirmed that the ratio of the area of the snow deposit to the product of the snowstorm duration and the height of the snow fence is constant. Three types of instruments for measuring amounts of drifted snow (Kuznetsov, Tolstov and Sabinin meters) were tested. Best results were obtained with the Sabinin meter. The Kuznetsov meter collected about 45-50% of the drifted snow.

SIP U6982

Izŭmov, N. N.
INSTRUMENTS FOR MEASURING THE AMOUNT OF DRIFTED SNOW. (O rabote metelemerov; Text in Russian). Trudy Nauchno-Issledovatel'skogo Upravleniĭa Narodnogo Komissariata Puteĭ Soobshcheniĭa, 109:86-91 incl. tables, 1930.
DLC, Slavic unclassified

Snowdrifts produced by winds were measured from 1927-1929 at the Vodenyapino Experimental Station of the Kazan Railroad. The data indicate that 86-90% of the snow was drifted in the 10-cm. air layer next to the snow surface. About 5-6% was drifted in the layer from 10-20 cm. high. The remaining 4-9% was drifted in the layer from 20-200 cm. high. Data obtained by the Kuznetsov meter indicated that the snow transfer in the 2-m. layer above the snow surface reached 2.67 gm./sq. cm. min. in light snowstorms and increased to 18.97 gm./sq. cm. min. in heavy snowstorms. The Kuznetsov meter collected an average of about 45-50% of drifted snow. These experiments aided in the construction of new instruments.

SIP U6983

Abramov, I. M.
SNOW LOADS ON ROOFS. (O snegovykh nagruzkakh na kryshakh sooruzheniĭ; Text in Russian). Trudy Nauchno-Issledovatel'skogo Upravleniĭa Narodnogo Komissariata Puteĭ Soobshcheniĭa, 109:92-98 incl. table, graph, 1930. 1 ref.
DLC, Slavic unclassified

Snow depth and density on roofs were observed during March 1929 in the railroad area of European USSR. The dependence of snow load on roof slope and on geographical location and elevation was noted. Snow-

cover density on roofs varied from 0.19-0.30; a mean value of 0.25 was employed for load calculations. The probable snow load on each sq. m. of roof projection may be considered as equaling 2.5 times the maximum snow-cover depth expressed in cm. The mean maximum snow load was calculated as 115 kg./sq. m. for Moscow, 70 kg./sq. m. for Leningrad, 40 kg./sq. m. for Kharkov, and 50 kg./sq. m. for Kiev.

SIP U6984

Muretov, N. S.
THE QUESTION OF GLAZE OBSERVATIONS. (Postanovka nablîudeniĭ nad gololedom; Text in Russian). Trudy Nauchno-Issledovatel'skogo Upravleniîa Narodnogo Komissariata Putei Soobshcheniîa, 109: 101-106 incl. tables, 1930.
DLC, Slavic unclassified

The importance of glaze on railroad communication is discussed and results of investigations made after 1923 at 130 places are reviewed. Rime occurs more frequently than glaze. Regions of frequent glaze are also areas of long glaze duration. Intensive glaze may last from 1-5 days. Glaze deposits over 25 mm. thick were observed in 7% of all cases recorded (536). Heavy glaze up to 114 mm. thick was observed on 5-mm. wires on Jan. 12, 1926 at Verknii Tokmak, which remained on the wires for 10 days at air temperatures between -1° to -11°C. The specific gravity of glaze varied from 0.6-0.9 and that of rime from 0.09-0.5 according to measurements at the Volnovakha Experimental Station.

SIP U6985

Izîumov, N. N.
THE STUDY OF FROST HEAVING AT THE EXPERIMENTAL STATION OF THE MOSCOW-KAZAN RAILROAD. (Proekt programmy rabot puchinoissledovatel'skoĭ stantsii Moskovsko-Kazanskoĭ zhel. dor.; Text in Russian). Trudy Nauchno-Issledovatel'skogo Upravleniîa Narodnogo Komissariata Putei Soobshcheniîa, 109:109-115, 1930.
DLC, Slavic unclassified

Physiographical origin of frost heaving and problems for further study are discussed. Clay, marl and other fine-structured soils, as well as the presence of ground water in the zone of soil freezing favor frost heaving. Methods of preventing damage and instrument design are included in the experimental station program.

SIP U6986

Haefeli, R. and Ch. Schaerer
THE TRIAXIAL APPARATUS. (Der Triaxialapperat; Text in German). Schweiz. Bauztg. 128, Nos. 5, 6, 7:51-53, 65-67, 81-84 incl. illus. diagrs. Aug. 3, 10, 17, 1946. 33 refs.
DBS, TA3.S41, v. 128

A triaxial apparatus is described, by which the deformation of soil, ice and snow samples, up to the flow or failure limit, under the influence of known external stresses may be studied. Fundamentals of the shear theory and rudiments of viscosity testing are discussed. The viscosity of ice under pressure from all sides may be tested with the device.

SIP U6987

Berg, E. V.
OPENING AND FREEZING OF LAKE ONEGA. (Vskrytie i zamerzanie Onezhskogo ozera; Text in Russian with German summary). Issledovaniîa ozer SSSR, Gosudarstvennyĭ Gidrologicheskiĭ Institut, 5: 103-120 incl. tables, 1933. 3 refs.
DLC, GB1707.A1L4, v. 5

Opening and freezing data on Lake Onega collected at 6 hydrological stations over a 45-yr. period are analyzed. First ice and final freeze-up occur on the southern shore at the beginning and end of Oct. and complete freeze-up occurs in Jan. First and complete openings take place in late March and early April and the lake is ice-free in June. The average time between the first appearance of ice and complete freeze-up varies from 14 to 35 days. The duration of a stable ice cover varies from 73-200 days according to location.

SIP U6988

Shipchinskiĭ, A.
THEORY OF THAW WEATHER AND SPRING SNOW MELTING. (K teorii ottepeleĭ i vesennego taîaniîa snega; Text in Russian). Meteorologicheskiĭ Vestnik, 35:31-35 incl. tables, 1925. 7 refs.
DWB, M(05) R969me, v. 35

A. I. Voeikov's theory on large-scale snow-melting processes is discussed. Thermodynamic calculations show that values of heat balance at the end of Feb. in Kiev-Voronegh latitudes are sufficient for snow melting only near noon. Intensive thaw weather over large areas probably originates from air masses moving along inclined surfaces from high to low pressure areas rather than in the horizontal direction only, thus introducing considerable dynamic heating.

SIP U6989

Dobrowolski, Antoni Bolesław
ICE PETROGRAPHY AS RELATED TO THE COASTAL LINE OF POLAR REGIONS. (Petrografia lodu a pojęcie linii brzegowej lądu polarnego; Text in Polish with Russian and French summaries). Acta Geologica Polonica, 3, No. 1:190-192, Suppl. 59-62, 1953. 8 refs.
DWB, Unbound periodical

Past and present views on ice from the practical and scientific standpoint are presented. The ice cover is regarded as a rock formation with exceptional thermodynamic properties. The coast line has been synomymous with the land line according to conventional geographic concepts. The shelf ice forms the coastal and territorial line of Antarctica according to the petrographic viewpoint.

SIP U6990

Koch, K. R.
THE ELASTICITY OF ICE. (Über die Elastizität des Eises; Text in German). Ann. Physik, 41:709-727 incl. illus. tables, diagrs. 1913. 7 refs.
DLC, QC1.A6, v. 41

Ice from lakes and ponds is traversed by air bubbles and channels which are in planes parallel to the frozen surface. Ice sections cut from Labrador and Bernina ice are shown. The bubbles and channels in the ice act as if the cross section were reduced and thereby the modulus of elasticity appears smaller. Experiments with lake ice from the Bernina Pass are described, using optical methods. A mean value of the modulus of elasticity of 626 kg./sq. mm. for a mean temperature of about -7°C was obtained for randomly oriented ice. Results for ice rods cut in the same direction differ from rod to rod. This deviation of the elastic modulus is attributed to varying temperatures of night and day causing internal stresses in the ice, and to alterations in crystalline structure on cooling after the temperature is raised when the rod is prepared by filing.

SIP U6991

Koch, K. R.
THE ELASTICITY OF ICE. (SECOND REPORT). (Über die Elastizität des Eises. Zweite Mitteilung; Text in German). Ann. Physik, 45:237-258 incl. illus. tables, diagrs. 1914. 2 refs.
DLC, QC1.A6, v. 45

Experiments were made on the bending of ice bars and on the period of their torsional oscillation to investigate further the large differences previously found in the elastic moduli of different ice specimens. The optical method previously devised was used to attain utmost accuracy in measuring resulting strains. The results obtained were, for bars of ice whose axes were parallel to the frozen surface, E_{90} = 957.6 kg./sq. mm. whether the bending was in the plane of the width or of the depth of the bar; E_0 = 1120.3 kg./sq. mm. for bars in which the axis was perpendicular to the frozen surface. The torsional experiments were also made by an optical method, and the torsional modulus of a rectangular ice bar was calculated according to the St. Venaut formula. Results obtained were F_{90} = 300.15 kg./sq. mm. for a bar with its axis parallel to the frozen surface, and F_0 = 278 kg./sq. mm. for a bar with its axis perpendicular to this plane. (See also SIP U6990)

SIP U6992

Holmsen, Gunnar
GROUND FROST ALONG THE ALPINE STRETCH OF THE DOVRE RAILROAD SYSTEM. (Taelen langs Dovrebanens høifjeldsstraekning; Text in Norwegian). Naturen, 41:218-222, 1917.
DLC, Q4.N15, v. 41

Permafrost at various places in northern Norway is discussed. The 2-m. thick layer of coarse gravel at Drivstuen was frozen 1.7 m. followed by a 10-cm. frost-free layer and by a 20-cm. frozen layer, below which the sand was frost-free. Frost depths at several other places varied from 2-2.3 m. Permafrost was observed below the 0.6-m. deep swamp at Fokstua where polygons are not rare and the frost may go deeper than the 1.9 m. observed.

SIP U6993

Dons, Carl
CONCERNING SNOWDRIFTS. (Litt om sneskaver; Text in Norwegian). Naturen, 43:137-142 incl. illus. graphs, 1919.
DLC, Q4.N15, v. 43

Characteristics of snowdrift formations around a cylindrical wooden stack and a house were observed in Tromsö during a steady wind. Airflow on the windward and leeward sides of cylindrical and rectangular obstacles is briefly discussed and presented graphically in vertical and horizontal projection.

SIP U6994

Palibin, I. V.
...MICROFLORA OF THE BARENTS SEA AND ITS ICE. (...Mikroflora Barensova morfa i ego l'dov; Text in Russian with French summary). Izvestiâ S. Peterburgskogo Botanicheskogo Sada, 4:71-80, 1904; 6:90-102, 159-183 incl. illus. table, 1906. 29 refs.
DLC, QK1.S14, v. 6

Botanical data collected from the ice of the Barents Sea during the summer of 1901 are compared with those obtained by Nansen and other explorers after 1867. Species found in the ice, melting ice, and sea water are listed. Large quantities of fresh-water flora were deposited on snow and ice in the Barents Sea. The data indicate that wind and sea currents are important transfer agents. Probable routes of ice drifting are determined from studies of flora found in the ice.

SIP U6995

Berger, Carl and Charles Saffer
THE EXISTENCE OF "β" ICE. Ice Physics Program Tech. Art. Commonwealth Eng. Co. Ohio, 3p. July 6, 1953. 7 refs.
SIPRE files, S-2413

The experiments of Seljakov on β ice were repeated to verify the existence of ice giving a Laue pattern with rhombohedral symmetry. Ice crystals were produced at water temperatures of -2.50 to -3°C and ambient air temperatures between -5° and -16°C, and the crystals were subjected to X-ray crystallographic studies. A single crystal gave a typical hexagonal α Laue pattern when mounted with the X-ray beam parallel to the 6-fold axis. The same crystal gave a pseudo-trigonal Laue pattern when tilted so that the 6-fold axis made an angle of 15°

with the X-ray beam. Ordinary (α) ice gives a pseudo-trigonal pattern in this position. No evidence was found for the β form of ice. (See also SIP U1114-U1116)

SIP U6996

Berger, Carl and Charles W. Saffer
NUCLEATION OF SUPERCOOLED BULK WATER. Ice Physics Program Rev. Art. Commonwealth Eng. Co. Ohio, 28p. incl. graphs, [1953]. 42 refs.
SIPRE files, S-2414

Factors influencing the spontaneous freezing of supercooled bulk water under standard atmosphere conditions are reviewed. It is concluded that, the amount of supercooling is a function of the physical environment of the water; the effectiveness of certain insoluble materials to promote nucleation is determined by their resemblance to the ice-lattice configuration; the rate of cooling does not affect the nucleation temperature; and, shock or agitation may be an initiative mechanism for the mechanical production of freezing nuclei. The effects of magnetism, electricity and sonics should be investigated.

SIP U6997

Berger, Carl, Ted Dimitriu and Jack Combs
ICE PHYSICS PROGRAM. Quart. Rept. No. 2, Commonwealth Eng. Co. Ohio, 36p, incl. illus. tables, graphs, Nov. 10, 1952. 20 refs. (Contract AF 33 [616]-127)
SIPRE files, S-2415

Nucleation apparatus and stereophotographic equipment for crystallization studies were devised. Rau's experiments on supercooling water droplets were repeated using liquid N and dry ice-acetone as coolants. The results indicate that Rau's work suffered from acetone contamination. The effect of a series of contaminants on nucleation temperature were determined and correlated with atomic structure. The findings of Dorsch and Hacker concerning the relationship of supercooling to drop size were substantiated. The tests on nucleation temperature of distilled water were in good agreement with the findings of Smith-Johannsen. Plans for adhesion studies and the re-examination of Seljakov's findings are briefly outlined.

SIP U6998

Berger, Carl and Jack Combs
ICE PHYSICS PROGRAM. Quart. Rept. No. 4, Commonwealth Eng. Co. Ohio, 62p. incl. tables, diagrs. April 30, 1953. 2 refs. (Contract AF 33 [616]-127)
SIPRE files, S-2417

Sketches and descriptions are given of surface ice crystals produced in water and water solutions through surface cooling, surface seeding with ice crystals or stirring to form subsurface ice crystals. Certain contaminants influence nucleation more than others. An activity series, indicating the comparative nucleating ability of the contaminants, is presented.

SIP U6999

Berger, Carl and Jack Combs
ICE PHYSICS PROGRAM. Quart. Rept. No. 5, Commonwealth Eng. Co. Ohio, 78p. incl. illus. tables, diagrs. July 31, 1953. 1 ref. (Contract AF 33 [616]-127)
SIPRE files, S-2418

The apparatus and laboratory techniques for examining microscopically ice growth on various surfaces is described. Ice crystal growth at different interfaces is sketched. Evidence indicates that the type of ice crystal formation at an interface of adhesion is a function of the thermal resistance of the substrate. Variations of interfacial tension influence the crystal forms of ice on some surfaces.

SIP U7000

Berger, Carl and Jack Combs
ICE PHYSICS PROGRAM. Final Rept. Commonwealth Eng. Co. Ohio, 38p. incl. illus. graphs, diagrs. July 31, 1953. 60 refs. (Contract AF 33 [616]-127)
SIPRE files, S-2419

Earlier studies, and work of the Ice Physics Program on the basic physics of ice are summarized, particularly the determination of the nature and parameters affecting nucleation, crystallization and adhesion. (See also SIP U6282, U6995-U6999)

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